The CONSOLIDATION of fragmented AGRICULTURAL HOLDINGS

ROME, ITALY

FAO
FIAT PANIS

FAO AGRICULTURAL STUDIES

Breeding Livestock Adapted to Unfavorable Environments, 1948, 178 pp., 71 illustrations, 44 tables, maps, charts, references. Second printing 1949. Price $1.50 7s.6d.

An analysis of the adaptability of various types of livestock to geographic and climatic conditions.

Preservation of Grains in Storage, 1948, 174 pp. Price $1.50 1s.6d.

Papers presented at the International Meeting of Infestation of Foodstuffs, London, 5-12 August 1947.

Using Salty Land, 1948, 49 pp., tables, charts, references. Price $0.50 2s.6d.

Soil Conservation: An International Study, 1948, 189 pp., 96 illustrations, map, charts, references. Price $2.00 10s.

Nutritional Deficiencies in Livestock, 1948, 102 pp., 49 illustrations, 13 tables. Second printing 1949. Price $1.00 5s.

An analysis of the dietary factors limiting the world's production of meat, milk and eggs, with recommended nutrient allowances for livestock.

Storing and Drying Grain - In Canada, in the United States, in the United Kingdom, 1949, 42 pp. Second printing 1949. Price $0.50 2s.6d.

Describes current practices of grain storage and conditioning in three highly industrialized countries with widely differing climatic conditions and crops.

Better Utilization of Milk, 1949, 76 pp., tables, bibliography. Price $0.75 3s.9d.

A survey of milk use practices, intended as a guide for government administrators and technicians in the establishment of dairy production and manufacturing policies.

Rinderpest Vaccines, 1949, 72 pp., 2 illustrations, tables, bibliography. Price $1.00 5s.

Their production and use in the field. Based primarily on material presented and conclusions reached at the FAO Nairobi Rinderpest Meeting held October-November 1948.

Efficient Use of Fertilizers, 1949, 182 pp., 50 illustrations, tables, maps, chart. Price $2.00 10s.

A guide book on fertilizers and their use in crop production, intended for agricultural administration and advisers throughout the world. A commercial English edition is available from Leonard Hill Ltd., 9 Eden Street, London, N.W. 1.

Some Important Animal Diseases in Europe, 1949, 194 pp., tables, bibliography. (E, with French summaries). Price $2.00 10s.

A compilation of papers presented at the Animal Diseases Meeting in Warsaw, Poland, 1948, providing important basic information about developments in the control of certain animal diseases.

Consolidation of Fragmented Agricultural Holdings, 1950, 99 pp., 2 maps, 3 tables. Price $1.00 5s.

A general analysis of the cause and effects of fragmentation, and of preventive or remedial measures, supported by authoritative national studies of the problem contributed by Denmark, Ireland, Switzerland, and France.

Some Aspects of Food Refrigeration and Freezing, 1950, 205 pp., 72 illustrations, 10 tables. Price $2.00 10s.

A compilation of papers and discussions on refrigeration of food given at a meeting held in Copenhagen, Denmark, 11-23 October 1948.

(see inside back cover)

Basic Agricultural Training School,
Arni.

Library No. 486

Date of Receipt 3 JAN 1957

First Printing: September 1950
Second Printing: December 1953

CONTENTS

Foreword ... 1

I. General

1. Introductory ... 5
2. The Causes of Fragmentation ... 9
3. The Effects of Fragmentation ... 15
4. Prevention of Fragmentation ... 17
5. Consolidation ... 22
6. Financial Considerations ... 32

II. National Studies

1. Consolidation of Agricultural Land in Denmark ... 41
2. Consolidation of Agricultural Holdings in France ... 55
3. Relief of Rural Congestion in Ireland ... 64
4. Consolidation of Land in Switzerland ... 77

Appendix ... 93

FOREWORD

THE FORM in which this study is presented perhaps demands some explanation. A scientific paper ordinarily begins with an exposition of facts established by inquiry or experiment and thence proceeds to an analysis of these facts and to conclusions drawn from the analysis. Finally, it may suggest practical applications of these conclusions to the problems disclosed.

To attempt to set out, in however close a summary, all the evidence relating to such a widespread phenomenon as the fragmentation of agricultural holdings would mean the expansion of the study to a length far greater than that customary in publications in this series. Since also the strength of such evidence is essentially in its accumulation, the exposition would involve wearisome repetition which might well deter all readers but the specialist.

The known methods of dealing with the problem also depend for their suitability to particular cases so much on local conditions and on such fundamental things as the existing social structure and the general national economy that it is virtually impossible to prescribe, cut and dried, a course of practical action without reference to a concrete situation.

In these circumstances the course taken has been to incorporate in the study separate papers on the development, analysis, and treatment of the problem in selected individual countries. These papers may be regarded both as selections from the great mass of evidential matter available and as examples of practical measures of prevention, control, and cure applied to concrete situations. The four countries chosen—Denmark, France, Ireland, and Switzerland—are all countries in which fragmentation is or has been widespread and by which a concerted and successful attack on its problems has been made.

In other ways, however, they present interesting differences. In Denmark, the problem was attacked so long ago and so effectively that it is now largely of historical interest. In Ireland, fragmentation was, as often elsewhere, associated with a congested rural population and excessive smallness of the aggregate area of plots in a farm so that problems of resettlement are intricately mingled with those of consolidation. In Switzerland, a mountainous terrain has compelled realization of the distinction between avoidable and unavoidable fragmentation, while at the same time the high degree of autonomy of the cantons has posed special problems. In France, a large and populous country with much variety of agriculture and local custom but with a highly individualistic tradition, experience illustrates the difficulty of making an effective start, the extent to which

success depends on the farmer's realization of the problem, and the need to adjust methods to varying local conditions and popular sentiment.

Between them, therefore, the four national studies cover a field of experience and example much wider than their number and the geographical situation of the countries dealt with might suggest.

Part I includes a general analysis of the subject, a set of conclusions based on that analysis, general descriptions of types of preventive and remedial measures which have been and may again be found useful, and certain practical suggestions and warnings derived from past experience. Logically, it might be thought that this material should follow, and not precede, the national papers, and this order was in fact considered. It was decided to adopt the present order for the following reasons.

No national study can be expected to be a picture of the whole subject, but will necessarily deal with it in particular aspects and from particular angles. While, therefore, the place of national problems and experience in the general picture may be clear at once to the expert, the more general reader, whom also it is hoped to interest in this study, may obtain only a fragmentary, and perhaps a distorted, view of the general problem from such a series of special presentations. If, moreover, the national studies were placed first, it would be tempting, and indeed almost necessary, to hang the general treatise on the pegs thus conveniently provided. It was, however, particularly desired that the national accounts should stand as independent contributions and that such orientation and criticism as might be necessary should be left to the reader and not attempted by the writer of the general treatise. The fact, also, that the national studies are not merely a part of the evidence on which the analysis made and conclusions reached in the general part of the study are based, but are also examples of the practical application of the analysis and conclusions to particular cases, is perhaps a good reason for placing them after rather than before the more general part of the study.

The national papers are not, however, to be regarded as mere appendices to Part I of the study, but as its necessary and integral counterpart. The integrity of the whole study will, it is thought, be apparent from a continuous reading of it.

The national papers were prepared by authorities which will be recognized within the boundaries of the countries of which they write. Dr. Skovgaard was nominated to write the paper on Denmark by the National FAO Committee of that country. The other three papers were prepared departmentally by the governments of the countries concerned. The thanks of the Organization are due to the actual writers and to the governments concerned in these national studies for the interest shown and the trouble taken in the matter.

PART I

General

1. Introductory

By fragmentation is meant a stage in the evolution of the agricultural holding in which a single farm consists of numerous discrete parcels, often scattered over a wide area. This phenomenon occurs in most parts of the world where cultivation is long established, nor is it peculiar to any particular form of land tenure. The causes of fragmentation will be discussed in detail later. Here it is only necessary to say that excessive fragmentation is usually associated with congestion of rural population and laws of inheritance which prescribe distribution of property among surviving relatives according to a fixed system.

The word "excessive" here is important. Though compact and continuous farm holdings ordinarily make for efficiency in operation, geographical conditions may compel separation of plots, as in some alpine regions, or such separation may be harmless, as in monsoon regions where the same farmer cultivates rice or upland crops during the rainy season and riverine formations during the low-water season. Again, on a large mechanized farm it may be quite feasible with modern implements to work economically a block of land isolated from the main part of the farm, provided that the block is not too small.

In certain cases fragmentation is even considered advantageous. Where fruits, vegetables, and flowers are farmed intensively—for example, in the Vale of Evesham in England—a moderate degree of fragmentation spreads

the risk of damage from frost and places at the farmer's disposal a greater variety of soils and growing conditions than would usually otherwise be possible. In certain low-lying rice areas which are liable to severe early flooding, it is advantageous to have a small patch of higher land for use as seed nurseries, and such land often has a very high sale or rental value, quite out of proportion to its intrinsic productivity. In the case of farms consisting primarily of hill pastures, it may be highly advantageous as well as convenient for the farmer to possess a small area of valley land which may be used as intensive pasture, for the production of feed crops, and for farm buildings and residence. In other hill areas, e.g., Switzerland and Norway, where alpine pastures can be used only at certain times of the year, it is essential to their efficient use that they should be included in the same farm with middle and low level land. In parts of China, hill land provides fuel and green manure for the rice farmer whose main farm is in the plain. There are other cases, especially where the farmer lives in a village and not on his farm, where it may be important that a portion of the farm used for purposes requiring close and constant attention, e.g., gardens of betel vine (*Piper betle*) in Burma, should be near the place of residence.

These exceptions to the general rule that fragmentation of the farm holding is undesirable have been mentioned in some detail, not only because they are important in themselves but because they provide an excellent example of the too often forgotten fact that generalizations in respect of agriculture, which is essentially a local art, are full of risk. There is almost infinite variety in farms and in farmers and in all agricultural judgments due weight must be given to this fact.

That a degree of fragmentation is known to exist in an area is not, therefore, a sufficient reason for taking measures to eliminate it: it is necessary first to ascertain by careful local inquiry whether the fragmentation is, or is not, disadvantageous and whether it is, or is not, susceptible to correction. Even where it is decided that fragmentation is generally undesirable, it is necessary, before proceeding to any measures of compulsory consolidation, to consider carefully whether any exceptions should be made and whether consolidation of ownership will affect other social values to an extent that may make it desirable to devise some way of overcoming the disadvantages of fragmentation without actual change of ownership. It ought not to be necessary to record such self-evident propositions, but the history of "land reform" is so full of sad errors arising from the ill-considered application of sentimental or ideological generalizations that a *caveat* seems desirable.

Closely cognate with the problem of fragmentation, and often combined with it, is the even more widespread and obstinate problem of the

holding which is too small for efficient farming. This problem lies beyond the scope of the present work, but it should be mentioned, both because the same corrective measures must often be applied to the too small holding as to the fragmented holding and also because in consolidating fragmented holdings it may not be enough merely to regroup the fields among the existing farmers. It may be essential to efficient production to ensure that the reconstituted holdings are larger than those which existed before consolidation, which will immediately bring out that major problem of enlarging the size of farms, namely, what is to be done with the surplus farmers.

It is also essential to realize that agriculture should not be static but should be constantly developing. This is indeed vital if the farmer is to continue to supply the needs of the world's growing population and the increasingly complex demand for agricultural produce. What may have been bearable, or even reasonably satisfactory, to a community of subsistence farmers working with hand implements may become intolerable, or at least highly unsatisfactory, if the farmer turns to commercial production and more elaborate tools and methods. It is therefore advisable to look a little ahead in all cases, since the cliché that prevention is better than cure has real force in respect of these problems.

The example of Burma, a country already intensely interested in land reform from other angles and one with which the writer is closely familiar, may be cited here. Some years ago an inquiry was held as to the prevalence of fragmented holdings on the plains of Burma (the inquiry did not cover the hills). The fact was established that only in one administrative district of the plains—the Kyaukpyu District of Arakan—was the problem already approaching acuteness. In the end nothing was done, but it may be questioned whether this was wise. Although fragmentation may have been serious only in the Kyaukpyu District, the inquiry disclosed that the tendency clearly existed elsewhere, notably in the rest of Arakan and in the Prome District. Moreover, in connection with revenue settlement operations carried out in the Myingyan District of the Dry Zone just before the Japanese invasion, it became abundantly clear that many of the holdings in that district were too small to provide a living for the holder, who had to hire other land or to supplement his earnings by other work. The beginnings of fragmentation could also be seen. It is very probable that this state of affairs is general in the Dry Zone. The conditions which encourage fragmentation—namely, a growing population and a law of inheritance that makes for subdivision of holdings—are present in Burma; and, while pressure of population is not yet serious in most of the country and while the good sense of the Burma farmer has mitigated the results of the law of succession, the danger signals are there and should be regarded.

The plan of this book may be briefly stated as follows: Since it is as important to prevent as to cure, an attempt is made in Chapter 2 to examine the causes of excessive fragmentation; in Chapter 3 the effects of excessive fragmentation are set out; in Chapter 4 some account is given of preventive measures which can be taken; in Chapter 5 an attempt is made to summarize and discuss the various remedial measures which have been or may be applied; and in Chapter 6 there is some discussion of the financial implications of such measures. Following this general study is a series of four short papers on the problem in four specific countries in which the problem has arisen and in which it has been seriously attacked. The countries chosen are Denmark, France, Ireland (Eire), and Switzerland, and the papers have been contributed by acknowledged authorities on the subject in the country concerned.

Except in these four cases, no attempt has been made to present a systematic account of the problem in individual countries, and references to countries are incidental and by way of example. This course was adopted in order to avoid wearisome repetition and to limit the publication to an easily readable length.

Also, no attempt has been made to prescribe any general plan of preventive and remedial measures for universal application. Such a plan would be impracticable in view of the wide differences in conditions found in the various countries affected. What has been done is to attempt to set out possible measures of prevention and cure which have been tried or which seem worth trying, together with some account of the advantages and difficulties attaching to these measures, and to establish certain general principles, which may well be liable to many exceptions, to be borne in mind in preparing remedial measures. It is hoped that this procedure may be useful in assisting any country in which this problem exists, by a process of selection and elaboration, to evolve its own plan suited to its own peculiar conditions.

2. The Causes of Fragmentation

SOME ANALYSIS of the causes of fragmentation is necessary in determining, in any particular case, its effects on agricultural efficiency, the possibility of eliminating it, and the preventive or remedial measures desirable and practicable.

There are four general types of fragmentation:

(1) that which is unavoidable by reason of natural conditions;

(2) that which arises from physical conditions created by human activity not connected with agriculture, e.g., fragmentation due to the construction of roads, railways, canals, reservoirs, and buildings or to the establishment of forest or game reserves or national parks;

(3) that which is agriculturally rational, i.e., which can be justified in terms of agricultural convenience or efficiency; and

(4) that which, though not falling within the first two categories, is agriculturally irrational, i.e., in which the reasons for the fragmentation are not reasons of agricultural convenience or efficiency.

Some short reference has already been made to the reasons for the first three types in the previous chapter, and it is not intended to pursue these causes further here. For our present purpose, all that is neecssary in respect of these types is to keep their existence clearly in mind, especially when discussing remedial measures. There is, however, one point which should be made: it may happen that fragmentation, which was at one time unavoidable, harmless, or beneficial may, by reason of some change in the methods or economics of agriculture, become unnecessary or cease to be rational. Something of this kind seems to have happened in Ireland, where small holdings created to meet the needs of small-scale arable farming became unsatisfactory when the economy of the industry turned more towards stock and dairy farming.

The fourth type, fragmentation which, though not enforced by natural or other physical conditions is yet not due to agricultural causes, is the one with which the present study is concerned. Experience of farmers of many nations suggests that, as a class, they are not only sane but even exceptionally shrewd. It therefore seems reasonable to expect that, where

the original fragmentation was neither beyond their control nor justifiable in terms of agricultural convenience and efficiency, causes outside agriculture must be sought, and that these will concern things which the farmer has valued more highly than agricultural efficiency; and, where inquiries can be pursued, this seems indeed to be so, though these proximate causes normally arise only where there are predisposing conditions which tend to activate or intensify the human feelings on which the proximate causes depend.

The first of these conditions is that cultivation should be well established. The process of fragmentation usually requires several generations to become effective. It is true that in very newly settled areas a form of fragmentation may be found, since the settler naturally picks the easiest and apparently most suitable patches for his first efforts. Such fragmentation is, however, rational and usually transient. In the recently settled areas of North America and Australasia, fragmentation is virtually unknown. Though for the most part fragmentation occurs where land has been farmed for long periods, it is not an inevitable result of such continued occupation, as the case of Great Britain shows.[1]

A second predisposing condition is increasing density of rural population in a limited area. Such increasing density is clearly a direct cause of successive subdivisions of holdings. It does not seem, however, that such subdivision necessarily involves physical separation of the various parts of the resulting holdings, and indeed such separation may be a result of individual efforts to correct a tendency to excessive subdivision by grouping together as a single farm several separate small holdings. On the other hand, in such a situation psychological factors, such as the desire to effect a fair division, often lead to fragmentation, and there is no doubt that it is almost always in these congested areas that excessive fragmentation is found. This of course is natural, since subdivision normally takes place only where land values are relatively high, which is unlikely where large areas of unused land are available. Density of agricultural population is also usually associated with lack of alternative employment for members of the cultivating classes. In these circumstances an expanding population is tied to the land, and the tendency towards subdivision becomes more pronounced.

The agglomeration of the houses of farmers in villages is often held to be a cause of fragmentation. It is hard to see why this should be, and it is certainly not true that fragmentation always accompanies the "village system." Living away from the farm is, however, a predisposing condi-

[1]Irrational fragmentation does occur in Great Britain, e.g., in Sedgemoor (Somerset) and in parts of Dorset, but the condition is certainly exceptional.

tion to the extent that the inconvenience of scattered parcels is less obvious to a farmer who does not live on any part of his farm than to one who does.

Furthermore, a condition which greatly facilitates progressive fragmentation is obviously the existence of the right of the landholder to transfer and alienate his rights in the land freely and in particular the right to subdivide or add to existing holdings. Fragmentation is not, however, a necessary consequence of such a right, which may equally facilitate the growth of large estates, nor is fragmentation unknown where this right does not exist.

In agricultural countries where industry and commerce have not been greatly developed, land is often the principal—and indeed, apart from money-lending, almost the only—object of investment. Such a situation places an undue value on land as an interest-bearing investment and encourages an attachment to the soil as the sole way of life of the rural population hardly comprehensible to countries where farming is commercial and agriculture is one way of life among many. Lack of balance between agriculture and other occupations in a national economy may thus become a potent influence on a process of fragmentation.

Long-established cultivation, shortage of land, unrestricted rights of transfer, pressure of population, and living away from the farm are thus conditions that encourage excessive fragmentation, but the operative causes are almost always more specific.

Before considering these causes, one or two factors which do not seem to have any appreciable effect on fragmentation may be mentioned. The phenomenon of fragmentation is not associated with any particular form of land tenure or ownership. It has occurred both in countries where the agricultural land has been held in large estates and in countries of small family holdings. It is found in areas of tenant farming and in those where the proprietor works his own land. It may equally be associated with a serf population, with well-established peasant farming, or with the growth of independent small holders. It may occur with or without individual ownership of the land, of the holding, or of the plot. Communal tenures, whether independent or on the estate of some great landlord, seem to have little effect on its incidence: some of the worst examples of cultivation in narrow strips and scattered fields can indeed be found under such tenures.

Nor is fragmentation exclusively associated with the breaking up of previously larger holdings. On the contrary, it may occur during a process of building up a farm, as in the case of the Vale of Evesham mentioned above. It may also arise from the haphazard accumulation of landed property, as in the case of the acquisition of land by moneylenders in

settlement of bad debts, or from purchases of cheap pieces of land by farmers with limited capital who desire to increase their holdings.

An important direct cause of original fragmentation may have been the "three-field" system[2] in Europe and variations of this system in other parts of the world where communal tenures exist or used to exist. Not only do such systems, while actually in being, tend to encourage the fragmentation of holdings but, on or after the abolition or supersession of the system, their influence may remain potent both during the actual division of the communal lands and afterwards. The distribution of holdings in Maps 1 and 2, even after final consolidation, still shows traces of this ancient influence.

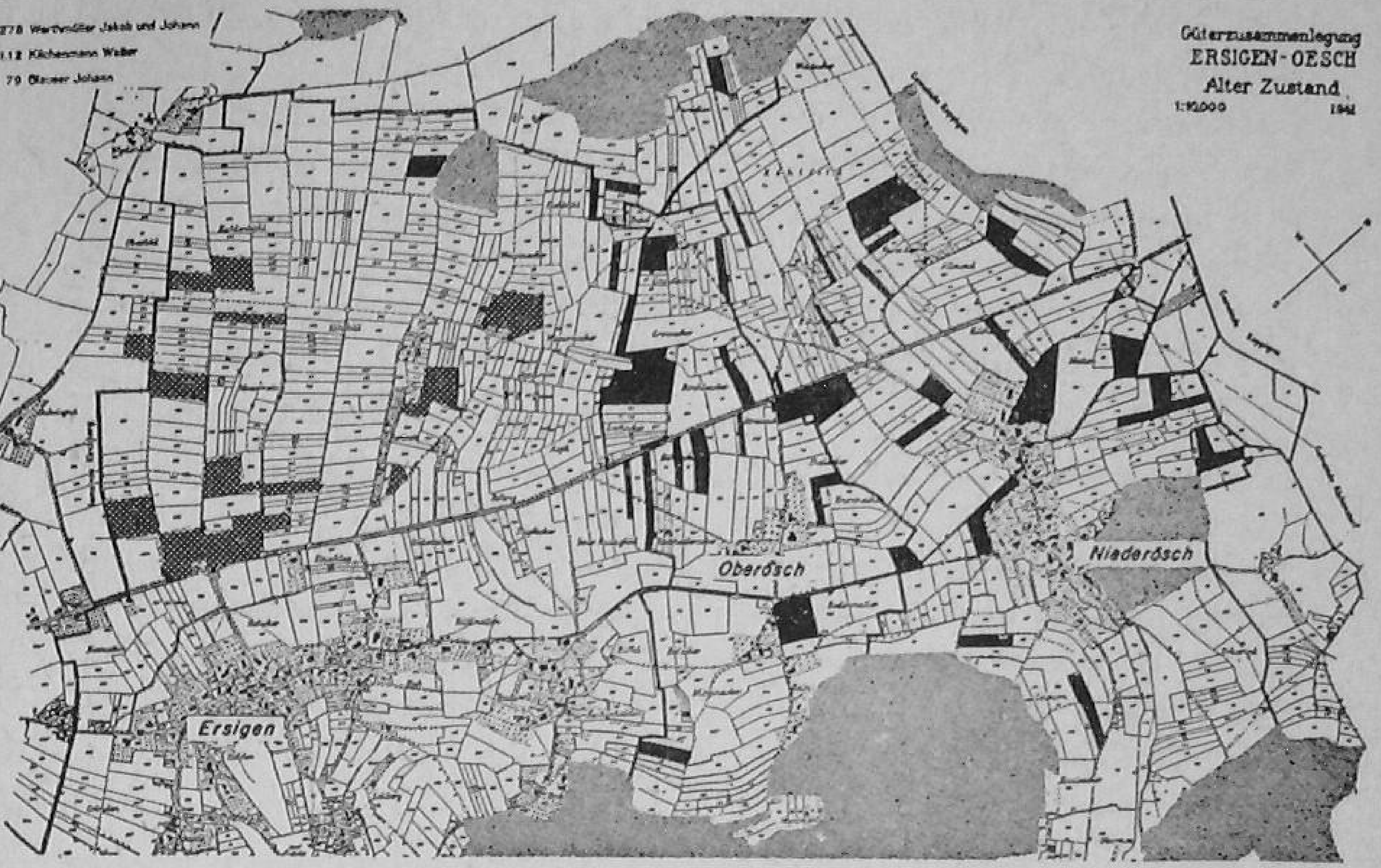
Another cause of fragmentation under communal and feudal systems has certainly been the desire to effect a fair division of the village lands, and especially of those convenient lands near the village itself. This desire, and the three-field system, may together account for the fact that, although the villein of feudal times had no right to transfer his land, yet his holding was fragmented. It is also noteworthy that these communal systems normally operated where there was no undue pressure of population on the land: indeed, ample land seems to be essential to the operation of the three-field system.

There is little doubt that, in those cases where the first appearance of excessive fragmentation was not due to physical causes or to the pursuit of economic advantages, a principal proximate cause has often been the existence of laws or customs of succession which authorize or compel the division among heirs of land over which a deceased person held rights. Such laws and customs are widespread in the world. In continental Europe the principle derives from Roman law, but its application became much more general as a result of the profound influence of the Code Napoléon on the legislation of many European countries during the nineteenth century. In Asia the principle is found in Mohammedan and Burmese Buddhist law, and is implicit in the Hindu law of ancestral property, though in this case profoundly modified by the institution of the undivided family during the continuance of the coparcenary.

It is notable that in Europe, where both opposite principles of succession exist—namely, the right of the heirs to demand the physical division of the estate into parts of equal value, and the system of undivided inheritance by one principal heir—the prevalence of subdivision is usually in direct ratio with the prevalence of the former principle. Thus in Eng-

---

[2]The "three-field" system under the old European village organization was an arrangement whereby the village land was divided into three blocks, one of which was left fallow each year.



Maps 1 (above) and 2 (below). Ersigen and Oesch, Switzerland. These two maps show the state of the lands of the Swiss villages of Ersigen and Oesch before and after consolidation. The patterned areas indicate the plots included in three particular farms.

land, where until 1925 succession to real estate by one principal heir was the rule, and in Norway, where the principle of undivided succession is reinforced by a right of family redemption (*odel*) of alienated land, irrational fragmentation, except very locally, is not a serious problem, while in France, where the Roman law principle of equal division, previously operating only in the South, was extended and intensified by the egalitarian tendencies of the Revolution and the Code Napoléon, it was estimated in 1929 that 10 million hectares of land were excessively broken up.

Equal division is not always mandatory. In the Code Napoléon, for example, there is an exhortation to avoid, as far as possible, the subdivision of the estate. In practice, however, it seems that where equal division among the heirs is permissible, it tends to become general through mutual jealousy of the possible heirs. Even where joint succession to an undivided estate is the established custom, as among Hindus, it is obvious that in a very few generations the joint owners become so numerous and their unanimity so difficult to maintain, that the probability of resort to partition rapidly increases.

In many parts of the world there is great local variation in surface soil, in ground level, and in water conditions within a small area, and in these circumstances the attempt at equal distribution leads not only to reduction in the area of individual farms but also to division into long narrow strips or small irregular plots and to actual fragmentation. Once the process of fragmentation has begun, it is accelerated with each succeeding generation in geometrical progression, so that in a very few generations a quite remarkable number of parcels may be formed. Equal inheritance by women with men, though it may tend periodically to check the diminution in the *size of the holdings*, tends also to increase the degree of *fragmentation*. Common sense should, however, be used in ascribing an existing state of fragmentation solely or mainly to laws of inheritance. The high degree of fragmentation which subsisted in parts of western Ireland, for example, seems to have arisen in spite of the English laws of primogeniture; and it is at least improbable that a change in the Austrian law of succession enacted in 1868 should lead to a critical situation twelve years later, as has been suggested.

There is a further condition which usually accompanies excessive fragmentation and is certainly causative as well as concomitant, namely, the almost complete dependence of the farmer on a particular piece of land for his very existence, and his lack of alternative employment. This situation, by intensifying the importance of the physical possession of land, increases the insistence on personal rights and encourages the subdivision of inherited property.

Another important cause may be lack of liquid capital or equivalent credit. Where the custom exists of equal division of property among heirs, it may often happen that lack of facilities for raising a loan on the land, at least on reasonable terms, may make a physical division of landed property the only way of dividing the estate.

3. The Effects of Fragmentation

THE MOST OBVIOUS EFFECT of dividing a farm into a number of physically separated parcels is to make the working of the farm unnecessarily difficult. This is always true except where the work is carried on at different times or by different persons and implements. In the case of unavoidable fragmentation this handicap must be borne, while in the case of rational fragmentation other advantages are held to outweigh it, but in both cases the disadvantage is there. Time is wasted and extra expense involved in moving workers, animals, and implements to and from the farmstead and from one field to another, and in carrying seed and manure to the various fields, and crops from the field to the threshing floor, stockyard, or barn; supervision is rendered more difficult; depredations of animals and birds are harder to control; expense on fences, water supplies, buildings, threshing floors, etc., is often much greater; comprehensive drainage or other schemes of improvement may be rendered impossible; access to the various fields may be difficult, especially during the season when crops are on the ground; more hands may be required, especially for watching cattle and crops; and so on. These are difficulties which arise from the mere physical separation of the plots. Their extent and importance may be well gauged by tracing the various component parts of almost any of the holdings shown in Map 9. A cognate difficulty is that the farmer cannot live "on his farm" in any real sense, and this is a very definite disadvantage

in those cases where more general considerations do not outweigh the advantage of living on the farm.

The dispersal of fields also gives rise to technical difficulties. The difficulty of access to the various fields limits the choice of farming systems and crop rotations by compelling the adoption of a system of cropping which allows all to have access to their scattered fields at the same time and on individual farms may cause the adoption of unsuitable crops and rotations. The individual plots, having been laid out on the basis of equal shares of similar land and not on the basis of efficient farming, are frequently of unsuitable size or shape. A very common method is to divide the land in long, very narrow strips crossing the contours. This ensures equal division of land with different soils and water conditions but may, especially in strongly undulating or hilly country, force the adoption of uneconomic cropping systems and greatly increase the risk of erosion. The strips may even be so narrow as gravely to hamper cultivation and to cause unnecessary waste of land. This wastage is even more marked where land is divided into small plots of irregular shape: in such cases the waste area due to corners, uncultivable banks, boundaries, etc., may be quite disproportionate to the area of the plot. On fields of this kind, also, soil conservation works can be undertaken only at the expense of much waste of land and effort.

The maintenance of pasture and the keeping of grazing animals generally is made difficult, if not impossible, by the fact that access to many of the fields is possible only through the land of other farmers. Also, the standard of weed and pest control tends to become the standard of the worst farm in the vicinity since the neglected fields become much worse sources of infestation than where farms are compact blocks of land.

These are obstacles in the way of efficient farming under existing conditions and by existing methods. When the effect of fragmentation on the prospect of improving land and farming methods is examined, the disadvantages are even greater. Where holdings are badly fragmented most substantial improvements, other than such purely external improvements as the use of improved seed and more or better fertilizer, and many desirable changes demand close co-operation among many individual farmers. Even the simplest drainage scheme is likely to require such co-operation, as also is the provision of wind and weather breaks, of water supply for animals, of minor surface irrigation works, and of protective embankments. In spite of the evidence of the practical possibility of such co-operation provided by China and other countries, it can hardly be disputed that the need to obtain the agreement of a large number of persons to the change proposed and to the precise method of effecting it will greatly increase the difficulty of carrying out the improvement.

There is also inevitably much wastage of land which will increase as attempts are made to improve methods of cultivation until in extreme cases the smallest plots simply revert to waste.

The position is even worse in regard to more radical changes, such as extensive soil conservation measures, mechanization of agricultural operations, and major irrigation or drainage schemes: such changes are practically impossible without drastic reorganization of the farms, even though this reorganization may sometimes be effected without actual change of ownership—for example by co-operative cultivation. Almost all important changes in agricultural method and organization will be gravely impeded, if not absolutely prevented, by irrational fragmentation. However, this fact is perhaps of less practical importance than the difficulties that lie in the way of the small day-to-day changes which have, in the past, made up the greater part of orderly agricultural progress.

4. Prevention of Fragmentation

ATTEMPTS AT REMEDIAL MEASURES will ordinarily be useless, or at the best only temporarily effective, unless at the same time steps are taken to prevent the continuance of the influences which have been the past cause of the fragmentation and will, unless checked, infallibly lead to its future recurrence.

At the worst these influences may be so fundamental that only basic changes in economic or social organization can remove them, as, for example, when the excessive subdivision of farm holdings is the result of the pressure on the land of a dense and otherwise unemployable population. It is, however, thought that there are few areas where fragmentation, as distinguished from general excessive subdivision of holdings, cannot be considerably reduced by less drastic means.

Every attack on the problem must be preceded by a careful historical study and analysis of the causes of fragmentation in the particular case studied. It may, of course, be found that these causes have ceased to operate; for example, where fragmentation arising in one form of agriculture may have survived a change to another form. It may also be found that the causes are natural and cannot be removed, as in the case of patchy distribution of cultivable land in a mountainous or desert country. But in most cases the causes will still be operative and are avoidable or removable.

The most usual cause of excessive fragmentation may be briefly restated as the influence of a social structure that creates a too great demand for a limited area of land by a population completely dependent on the land under a system of private law and custom which encourages progressive subdivision, especially subdivision intended to maintain, by a meticulous similarity in each subdivision, a physical equality of shares in the original holding.

In such a situation the obvious method of attack might seem to be legislative action to prevent excessive subdivision, and legislation usually finds a place in the preventive and remedial measures actually adopted. Such action by itself, however, not only leads to considerable practical difficulty, but is likely to be ineffective. The practical difficulty arises from the fact that it is virtually impossible to prescribe a minimum area suited to all types of farming and to all types of land. Thus, a minimum area suited to grain production might be both too small for pasture farming and too large for intensive market gardening or orchard cultivation. The danger that the law will be ineffective arises from the fact that regulation cannot move much in advance of public opinion. Legislation for which a community is mentally, physically or economically unready merely results in wholesale evasion and resistance which cannot be dealt with for lack of the support of public opinion. It is also important to remember that legislation which, by establishing a minimum farm area, limits the number of farmers, may, as population increases, become unworkable unless opportunity is provided for alternative employment. Regulatory legislation should, therefore, on the one hand be so framed as to allow considerable discretion to local administering authorities, and on the other be accompanied by measures of education, inducement, and persuasion directed towards the development of public opinion.

The type and extent of discretion necessary will depend on local conditions, and it is not possible to say more than that it should be sufficient to allow for the orderly development of all types of agriculture which are of local importance. The possible breadth of such discretion may be illustrated by comparing the minimum area necessary for a family holding

under such intensively cultivated crops as off-season flowers in Europe or betel vine in Asia and the area necessary for extensive pasture in a dry country. Many factors which defy generalization enter into the calculation—the crop rotation adopted, the extent of necessary fallowing, the intensity of cultivation and manuring, the annual variation in rainfall, the relative local economic advantages and disadvantages of different crops and types of cultivation, the financial and material resources of the farmer, and so on.

Such discretion can obviously be given only to tribunals with close local knowledge and practical experience of farming and such tribunals are an essential feature of successful regulatory laws of this kind.

The nature of collateral measures of education, inducement, and persuasion depends on the sociological and cultural background of the people concerned, and here again generalization is difficult. The usual cause of fragmentation — and of excessive subdivision generally — is too great a desire to hold land on the part of too many people. It is necessary to examine the causes of this desire very carefully in each case before it can be countered. In the most obstinate cases this desire for land arises from a real absence of employment alternative to agriculture and a real shortage of land available for use. Such conditions are often merely local, but in the worst cases may be national. There are, however, many simpler cases in which the desire to hold land is due to mere mental inertia, to social pride or prejudice, to such human failings as suspicion or jealousy, or to lack of economic imagination and alternative outlets for capital.

It will frequently be found that measures of general utility to an agricultural economy will have a valuable effect on the special problem of unhealthy demand for land. Action, for example, directed towards the maintenance of moderate and stable land values falls in this class. It is not the intention to raise here the vexed question of the possibility of controlling those violent fluctuations in commodity prices which are perhaps the most obvious cause of changes in the values of agricultural land, but to direct attention to the existence of other causes of unduly high land values which are more or less independent of the price levels of farm produce. An intelligent policy of land taxation can be at the same time one of the best aids to agriculture and a deterrent both to speculative dealings in agricultural land and to the emergence or perpetuation of the type of landlord who is not a farmer but relies on the mere possession of agricultural land, as against its use, as a source of income. Measures to limit rents, to secure the tenant in his tenancy, and to protect the tenant's right to improvements may be similar two-purpose measures, and so may the

regulation of interest rates on loans to agriculturists and control of the appropriation of unearned increment in real land values, as opposed to paper increases due to monetary fluctuations.

An important class of measures consists of those which restrict the transfer of agricultural land. Reference has been made to the prescription of minimum areas for holdings or lots and the practical difficulties likely to be encountered. A somewhat similar provision, which has become a commonplace of legislation relating to consolidation, is the prohibition, except with permission, of the subsequent subdivision of holdings which have been duly consolidated. There is, however, a wider range of measures designed generally to control the disposal of agricultural land for the benefit of the farmers or the community. Unfortunately discussion of these measures tends to be clouded by ideology and the considerations on which the suitability of such measures to particular agricultural situations depends are too complex to be set out here; but it is plain that where laws restricting the free transfer of agricultural land exist they can be used as a powerful preventive of fragmentation, though this may be but a part of their main purpose, which is usually to protect the farmer from losing his land outright.

The provision of alternative means of employment may be an important essential in the success of other measures and careful consideration should therefore be given not only to the possibility of agricultural migration but also to the need for developing rural industries and to the possibility of absorbing surplus agricultural population in urban industry.

There are direct measures less radical and violent than a compulsory prohibition of subdivision which may be quite effective in limiting fragmentation. In some cases little else may be required except to provide an alternative means of transferring an interest in property. In effect, it may be that the reason why an heir insists on obtaining his exact physical share of landed property is simply that this is the only way in which he can get his share at all. In such cases a system of long-term loans made to one heir to enable him to pay off the rest may be a satisfactory method of preventing subdivision, and such a system of loans may also well be an essential counterpart to the smooth working of any restrictions placed on the free subdivision of holdings.

Another expedient which has on occasion been found effective is to provide means whereby an heir may retain an interest in land without actually working it. An agreement may be reached whereby the inheritance is worked by one heir while the others merely draw dividends on their shares in the property. This idea permits of variations. For example, an heir who does not work the land may mortgage his share to

the working heir by a simple mortgage redeemable at will, the dividends due on the share being set off against interest charges or repayment instalments, or by a usufructuary mortgage for a definite period. These measures will obviously be most effective if alternative means of employment are available.

Measures of this kind are usually better than attempts to deal with the system of division among many heirs by direct prohibition. The agriculturally irrational fragmentation of holdings, operating as it must against the farmer's natural care for the efficiency of his industry, necessarily has its basis in some very strong sentiment, the attempted control of which by legislation alone is likely to fail. The same considerations will probably apply to devices to avoid the effects of the system of inheritance by numerous heirs such as the undivided family or the right of pre-emption. Where such customs already exist, they can be powerful weapons against unregulated subdivision, especially if supported by financial assistance that enables the individual family to buy out malcontents or the pre-emptor to exercise his rights. Attempts to establish such customs where they do not exist will however be fraught with great difficulty. The best that can be done by means of legislation to deal with an unsatisfactory system of succession will usually be to ensure that there is nothing which prevents the adoption of a better system if the heirs so desire, e.g., that division among the heirs is not prescriptive but merely permissive. For the rest, reliance must usually be placed on making it easier to avoid physical division, on suggesting and facilitating the adoption of alternative forms of farm organization which will be effective without violent changes in the social structure, and on introducing educative measures directed towards convincing the farmer of the drawbacks of fragmentation and also of the advantages of consolidating holdings already fragmented. It is, in fact, on the education of the rural population in these matters that success finally depends.

5. Consolidation

In this chapter methods are discussed of dealing with fragmentation which is an established fact. Map 1 sufficiently indicates the physical aspect of a typical situation, but this is only one aspect of a very complex problem — and from a practical point of view often the simplest.

To reduce the physical situation to its simplest terms, let us imagine a village or township containing only homogeneous, unirrigated, agricultural land farmed by resident farmers; and let us assume that if the total area of cultivable land were divided equally into compact blocks in such a way as to give ready access to each block, every farmer would have a farm which he would work profitably and satisfactorily according to the type and method of agriculture considered suitable. In fact, however, each farm is divided into a number of discrete plots, without ready means of access, often far apart, and often too small even for single fields in a compact farm. Here the physical problem is simply to rearrange the distribution of the land among the farmers and at the same time to provide suitable roads and service lanes. Water rights create no problem, and the homogeneity of the land makes redistribution easy. In such circumstances an almost ideal consolidation is physically possible.

In practice, of course, the situation is seldom so simple. In the first place, where fragmentation has proceeded to extreme lengths, an agriculturally homogeneous area of this kind will seldom be found; indeed, one of the incentives to excessive fragmentation is wide variation in the fertility or productivity of a small area of land. In the second place, topography will usually set limits to the possibility of free rearrangement of fields. In the third place, even where land is not irrigated, variations in water conditions and supplies exert a considerable influence on the siting of farms and the arrangement of fields. In the fourth place, special circumstances arising from present use, e.g., the existence of vines or fruit trees or of buildings may make redistribution in fair shares very difficult and controversial. And so on. These factors complicate a satisfactory division, but they will seldom prevent it, and there will be few places, outside mountainous or desert areas, in which a rearrangement of land into satisfactory compact farms will not be physically possible.

The resultant farms, however, may differ considerably in size, type, and value, and it may not be possible to accommodate all the farmers

who originally worked the land. In other words, satisfactory consolidation may result in depriving some farmers of their farms or in leaving others with poorer land than they had before. In a densely populated countryside, with few or no opportunities for alternative employment, this may be a very serious matter, and the choice may be between depriving some farmers of their livelihood for the benefit of others and perpetuating a situation wherein many of the farmers, though perhaps better off than before, still have farms too small for satisfactory working. In such cases, the expedient of working the land, without division, in large co-operative or collective units may be a partial and temporary solution; but it will seldom be a complete or permanent one, especially as the efficient working of large farms usually demands methods different from those suited to small family farms — methods which sooner or later will involve less demand for human work and consequent redundancy of workers.

The physical and technical aspects of consolidation, however, are only the simpler parts of the problem. More obstinate difficulties arise from the fact that the farmers are human beings with normal human emotions and reactions. Reference has been made above to the effects of suspicion and jealousy in creating the problem of fragmentation. These human feelings are of equal importance when remedies are sought. In any ordinary scheme for consolidation, some farmers will almost certainly get a better bargain than others — and probably a still larger number will fear that others may do so. This is a serious factor in any voluntary or partly voluntary scheme of consolidation, not only before and during the actual work of consolidation, but after it is completed.

There are other equally strong human factors to contend against. There is the inertia of peasant tradition, which tends to obstruct all change. Or there may be a real attachment to the fields that the farmer knows and understands — perhaps largely sentimental, but strengthened by a not unnatural professional doubt as to the wisdom of changing this well-understood land for something less familiar. In all voluntary and partly voluntary schemes there is the obvious difficulty of getting a large number of people, however well-intentioned, to remain in substantial agreement throughout the whole proceedings: even a very few recalcitrants may wreck or seriously impair the best of schemes. In this connection a comparison between Maps 2-3 and 7-8 is instructive.

The next series of difficulties is financial. No scheme of consolidation can ordinarily be carried out without considerable expenditure. Quite apart from the expenditure which may be necessary on account of such preliminaries as survey and demarcation, the construction of roads and

cattle paths, and supervisory staff, it is almost certain that at some stage or other the question of compensation for loss and payments for benefits will also arise. Farmers who have lost by the redistribution and those who may be dispossessed will naturally expect compensation. It will usually seem reasonable that this compensation should be obtained primarily from those farmers who have benefited, but these may not accept the official estimation of their gains or, though willing to pay, may lack funds. Almost certainly capital will also be required to organize the consolidated farms, and special credit arrangements may be necessary for this purpose.

Finally, what may be called "social" difficulties may exist. Under this head come a number of miscellaneous difficulties deriving from the organization of the community itself. The land may be owned by one set of persons and worked by another, but the second set of persons may have well-established rights which must be considered equally with those of the owners. In extreme cases, as in parts of India, there may even be a number of intermediaries between the "owner" and the farmer, all with rights and expectation of profits. Again land may be jointly held — sometimes in a very complicated manner. For example, a holding of five plots may be worked as one farm by one man, but only one plot may belong wholly to him, the ownership of the others being shared, possibly with two or three different groups of persons. Water rights, or trees, or structures and works are often owned separately from the land. There may be communal or private rights of grazing, fuel-cutting, taking of wild life and produce, or passage which may affect other persons than those farming the area under consolidation.

Even this lengthy statement does not exhaust the possible difficulties, but sufficient has perhaps been said to indicate the great complexity of the problem.

Before considering the ways in which the problem may be attacked by co-operative or governmental action, it is perhaps worth noting that the farmers themselves often try to improve the situation by individual action. It will frequently happen that the right-holder in a fragmented holding lets some of his isolated fields and rents fields adjoining his own and even attempts to achieve consolidation by purchase of adjoining plots. In most cases the possibilities of individual action of this kind will be limited by financial and other considerations, but where such a tendency exists, its encouragement may be the best preliminary approach to the problem.

Action, other than individual action, may be private or governmental. Combined private action may take the form of the voluntary co-operation

of a group of farmers, either through a formal co-operative society or through some looser form of ad hoc association. For reasons which may be inferred from the statement of difficulties above, anything like complete success is unlikely to result from purely private enterprise, except in a few advanced communities; but where such spontaneous efforts are being made, it will usually be advisable for official action to take a form which will assist and encourage such efforts, rather than for such action to take an entirely new direction.

Governmental action may be divided roughly into action based primarily on compulsion and action in which compulsion is used only to the extent that it is necessary to facilitate voluntary effort. Consolidation by thorough-going compulsion presents few theoretical difficulties: the land is acquired compulsorily, redemarcated into compact blocks with adequate service lanes and roads, and reallotted to the farmers. In practice, however, this method is most likely to be used on a large scale where it is desired to acquire the title in the land for other reasons than the existence of fragmentation, as, for example, in the U.S.S.R. and certain countries of Eastern Europe. Where the land is owned in large and more or less continuous estates by landlords who are not farmers and may be absentees, but the actual farms worked are fragmented, as in Ireland, preliminary action may be taken to acquire the rights of ownership for the government either with the consent of the landlords or compulsorily. Compulsory acquisition of this kind has usually been carried out under special legislation and not under the ordinary laws relating to the acquisition of private land for public purposes. In such cases the special circumstances consist in a desire to eliminate the landlord. If this is not so, a procedure which may be practicable is to persuade the landlords themselves to carry out the consolidation of the fragmented farms worked by their tenants. The threat of compulsory acquisition may be used as a spur to individual landlords. Though this separation of title and agricultural occupancy may have important results and may simplify subsequent procedure, it will not usually affect the pattern of the actual operation of consolidation to any important extent.

For the most part, however, governmental action towards consolidation has aimed at encouraging voluntary action and supporting it by the compulsion of recalcitrants by financial and other inducements and by administrative and technical assistance. Activities of this kind need to be preceded by the education of public opinion to a point where at least a substantial proportion of the farmers will accept consolidation, and very careful and intensive preparation will therefore usually be required. The most usual requirement for the carrying out of consolidation has been the

consent of a simple majority of the holders concerned, sometimes with an additional stipulation that the consenting landholders must control more than half of the land concerned. In some cases an even higher proportion of consenting landholders has been required, but such requirements have been found to make operations very slow. Indeed even the requirement of the consent of a simple majority has been found to prevent consolidation where it is most needed, owing to the difficulty of securing the consent of a large number of smallholders. This has led some countries to permit the central authority to order consolidation where a substantial minority of the holders desire it. Other expedients have been adopted to obtain the required legal minimum. For example, in some countries central and local governmental authorities who hold land are treated as consenting owners for the purpose of commencing consolidation operations. In others, the absence of a formal objection is treated as consent. or the formal objection of a minimum proportion of the owners is necessary to prevent consolidation. In others again, consolidation may be begun without the consent of the statutory proportion of landholders if the competent authority certifies that the consolidation is in the public interest, or a lower proportion may be accepted if the government proposes to carry out irrigation, drainage, or reclamation works affecting the area. Sometimes the competent authority may initiate proceedings at the request of a smaller number of landholders than is necessary actually to carry out the consolidation: sometimes, indeed, proceedings could be started on the request of a single landholder. The general pattern which emerges is that consolidation proceedings are initiated by the government (or by a specialized agency of the government), usually in response to a local request, and are carried out if a sufficient proportion of the landholders concerned give their consent.

The actual consolidation is usually carried out either by a committee of the landholders themselves or by central or local officials on the advice of the landholders concerned. In either case a formal co-operative society may be organized for this purpose, as in Germany before the late war and in the Punjab (India), or the work may be done by ad hoc local committees. Except in advanced communities the progress of operations conducted solely by committees of landholders tends to be slow and rather painful, and perhaps the best authority is a joint board of officials and representatives of the landholders under a chairman with judicial experience. Whatever executive body is appointed, however, it is of the greatest importance that landholders should be associated closely with the operations and that a procedure — e.g., the public inquiry — should be

devised which gives the individual landholder an opportunity of making representations at every successive stage.

The inducements offered by the government to participation in a consolidation program may be personal to the individual farmer — credit facilities, subventions for the reorganization, restocking, and improvement of the new holding, or substantial financial assistance in the costs of actual consolidation—or they may be in the nature of the construction of public works, roads, drainage systems, irrigation works, and so forth, on condition that consolidation is carried out. Generous assistance given in the resettlement of farmers rendered locally surplus by the consolidation may be regarded as an inducement to participate, in cases where one purpose of the proceedings is to increase the size of farms.

The expenses of consolidation are usually shared between the government and the landholders, the proportion borne by the government depending on local conditions and the degree of urgency attached to the operations.

Before operations begin, a firm decision is necessary on the method to be used to ensure that what each farmer receives will be as nearly as possible the equivalent of what he had before. Such a result may be very difficult to achieve, and in the last resort monetary adjustments may be necessary, even where no reduction in the total number of farms is contemplated. No general formula for such a method can be suggested, but the following considerations will usually be relevant.

It will usually be advisable to omit from consolidation operations exceptional plots under perennial crops and plots to which unusual improvements have been made, unless direct exchanges which fit into the new grouping can be made. For similar reasons, plots containing barns, byres, and other buildings will often need special treatment, especially when a single building is used by more than one farmer or when one farmer has shares in several buildings.

If the operation of consolidation is economically justified, its effect must be to raise the total value of the area consolidated; hence any comparison of value between new and old holdings should be weighted according to the aggregate new and old values of the whole area.

The determination of comparative values of plots and holdings before and after regrouping is very difficult. An area will seldom be sufficiently homogeneous for a redistribution by area alone to be satisfactory; nor will a simple ratio of area to quality work, since a larger area of poor land, at any rate within the same agricultural climate area, will rarely be the economic equivalent of any smaller area of better land. The values of plots before and after regrouping will often differ and indeed the latter

value may vary according to the precise grouping adopted, since the value of a plot may be affected by its relation to other plots, by the type of farming for which it is to be used, and by its new position in relation to roads, farm buildings, etc. On land served by irrigation or drainage works, the ease with which water can be applied or removed is clearly of great importance in valuation, and this also may vary according to the new grouping adopted. In short, the value of a whole holding will often differ from the sum of the values of its plots taken separately.

In these circumstances, great flexibility in criteria of value is clearly essential, and the best solution is probably that the valuation should be made on the advice of and in accordance with the true opinion of the leaders among the local farmers. This procedure also has the almost inestimable advantage that it is likely to contribute to what should be one of the main objects in regrouping, namely, to satisfy the farmers that consolidation has not only effected a general improvement but has also produced a fair and equitable result.

The requirements for a consolidation scheme worked on this combination of compulsory and voluntary action may be briefly summarized as follows:

(1) There must be careful educative preparation, sufficient to secure the active support of a substantial proportion of the farmers affected by the scheme. The early efforts at consolidation will be the most difficult, because each successfully consolidated area will act as a valuable demonstration for subsequent operations. It is even possible that a demonstration based entirely on compulsion might be useful as an initial step towards more nearly voluntary schemes, if at first public opposition is too great. The consolidation of cropping mentioned below may also be useful in demonstrating the benefits of consolidating the holdings themselves.

(2) An essential to satisfactory consolidation is a cadastral survey on a sufficiently large scale to show the shape and position of the smallest plots.

(3) Other essentials are a careful registration of existing rights and an up-to-date classification and valuation of the plots to be consolidated and of perennial crops, buildings, and improvements not easily susceptible to direct exchange.

(4) Proceedings should normally be begun as a result of a local request and should not ordinarily be carried out unless, after due preparation, a substantial proportion of the landholders

support the proposal; but the proportion of consenting landholders required should not be so high as to make it too difficult for the necessary consent to be obtained.

(5) The system of calling for objections and treating absence of objection as consent may be a useful expedient where difficulty in obtaining consent is due to ignorance and lethargy rather than to active opposition.

(6) It will frequently be advisable to retain in reserve the power to proceed compulsorily in special circumstances, as, for instance, when consolidation is considered essential to the success of some important scheme of irrigation, drainage, or reclamation.

(7) The executive authority should be a body with local knowledge. A good composition for such a body will often be a combination of representatives of the local agricultural, revenue, and other departments with representatives of the landholders, preferably chosen by the landholders themselves.

(8) The executive authority should have available adequate professional and technical assistance and advice. The services of competent land surveyors, land valuers, and engineers in particular will usually be necessary.

(9) The landholders concerned should be closely associated with every detail of the actual consolidation, including assessment of compensation and betterment charges. These operations should, in fact, be carried out on the basis of the true opinion of the landholders, and the principal function of the executive authority should be to elicit this true opinion.

(10) Whatever the nature of the executive authority, skilled official supervision will be essential, and no operations should begin until suitably trained officials fully familiar with local conditions are available. The need for these will, of course, be in inverse ratio to the educational level of the farmers concerned.

(11) The form of farmers' organization adopted will depend on local conditions. Co-operative societies may be valuable where the local people are sufficiently familiar with co-operative principles and practice. In other cases, elected or nominated committees of fgarmers may be better. The actual operative agents will in most cases have to be small committees acceptable to the farmers.

(12) Individual landholders should be given an opportunity to make representations to the executive authority at every stage

of the operations, and such representations should be judicially considered before the next stage begins. If this is not done, there will be grave dissatisfaction and probably great delay due to multifarious appeals at a late stage in the operations.

(13) There should be one appeal, and normally one only, from each quasi-judicial decision of the consolidating authority. Usually the appellate tribunal should be of local origin, though it may be a permanent authority established for a series of operations, and the intervention of the ordinary civil courts should be avoided whenever possible, except as stated below.

(14) Provision should be made for application by individuals to a high judicial or administrative authority where there is a doubt whether the consolidating authority is proceeding according to law, and also for reference to such an authority by the local authority on specific points of law.

(15) The bulk of the expenses incidental to consolidation will normally have to be borne by the government.

(16) Proper provision must be made for the recording and publishing the proceedings of the consolidation authority and of appellate authorities and for including these findings in the national records of title and rights.

(17) Adequate financial arrangements must be made (these are discussed in the next chapter) and comprehensive financial rules framed for the guidance of the local authorities.

(18) It may be desirable to prevent subsequent changes in the distribution of the consolidated holdings, especially by way of subdivision, without the consent of the authorities.

It may sometimes be practicable, especially where cultivation is on the open-field system, to consolidate farms for working purposes without an actual consolidation of holdings, and this expedient may be very useful in certain circumstances. The method is, in effect, an extension of the attempts often made by individual farmers to consolidate their farms by renting adjoining patches of land. It has the merit of being less permanent than outright consolidation of holdings on the basis of transfer of ultimate rights and thus allows the consolidation to proceed by a process of trial and error. It may also be less objectionable to conservative farmers who are doubtful about making permanent changes in their holdings. As a permanent measure, however, it has obvious disadvantages. This was in principle the method adopted in the highly successful Gezira scheme in the Sudan, and the co-operative form of organization adopted

there is obviously well suited to this system. In essence, the arrangement is that individual owners let their holdings to the government or to the co-operative society and in return rent a compact block of land in the same area, which may or may not include their original land. Leases should be for reasonably long periods, and restrictions on the transfer of leased holdings to outsiders will usually be necessary. Obviously such an arrangement greatly simplifies a subsequent final transfer of rights. Careful preliminary measures of survey, demarcation, classification, valuation, etc., are equally important to such a procedure as to the method of transfer of actual title and in addition carefully designed rules as to improvements are necessary. Less formal arrangements may also be practicable—for example to co-operative cultivation of a number of holdings—especially in countries where the standard of economic and social education is high or in countries where there is still a well-developed communal tradition. If fundamental changes in agricultural method are thought desirable (e.g., the adoption of mechanized farming instead of the reconstitution of separate holdings), consolidation into large co-operative farms may be preferred. In such cases, individual holdings may be purchased by the society, or the system of renting used in the Gezira may be adopted.

In all consolidation operations, due regard should be paid to the fact mentioned in Chapter 1 that some degree of fragmentation may be rational and advantageous. The need, for example, of a farmer for both summer and winter pasture in certain hill areas, for land suitable for seed nurseries in rice areas, and for varieties of soil and situations in certain types of mixed farming should not be forgotten. Similarly no useful purpose is served by disturbing a local custom of working both an upland holding and a holding on river banks and islands where work is done at an entirely different season.

In all cases where the operations of consolidation have involved the acquisition by the government of the title of land which will still be used for farming, an important question of policy will usually arise, namely, whether the title is to rest permanently in the State or whether it is to be transferred to the farmer. If the former, a tenure policy has to be devised which will give to the state tenant and his family the security of tenure and of rights in improvements which are essential to orderly agricultural development. If the latter, unless it is proposed to make the farmer a gift of the land, which few governments will be in a position to do on any considerable scale, means must be devised for the repayment of the value of the land and its improvements, or at least of that portion of the value which it is thought practicable to recover.

6. Financial Considerations

CONSOLIDATION operations usually involve considerable expense, especially since the modern tendency is to carry out extensive measures of land improvement as part of the operations. Both the precise purpose of the expenditure and the extent to which it is subsequently recoverable from the farmers will vary greatly in accordance with national policy, the method adopted, and the financial position of the farmers. The object of this chapter is to indicate the most likely types of expenditure and to attempt a few practical remarks as to policy in the matter of recovery of funds expended.

First, where title in land has to be acquired by the consolidating authority, whether by consent or under compulsion, the question of compensation will usually arise. Sometimes a settlement may be effected by a simple exchange of the land acquired for other land at the disposal of the government, but usually payments of such compensation will be made in cash, or by the issue of government bonds or stock, which, if the operations are at all extensive, will involve governmental borrowing either immediately or subsequently. In such circumstances, cash prices, redemption payments, and interest charges on bonds and loans will be a financial commitment of the government.

Similar liabilities may arise in respect of land used for the construction of service roads, drainage and irrigation works, and other communal purposes and thus excluded from the new holdings. In this latter case, it is often the practice to treat the loss of actual land as offset by the improvement of local amenities and betterment of the remaining land, but this decision must depend on the circumstances.

Compensation may also be necessary to allow for a fall in the value of some of the new holdings as compared with that of the old. Such liabilities will be reduced to a minimum if the consolidation is skilfully carried out, and minor theoretical losses remaining may often properly be regarded as offset by the general improvement in value due to the rearrangement; but circumstances may arise in which actual payments are necessary.

Losses in value of some holdings will often, on paper, be counterbalanced by increases in the value of others, and in such cases the question whether recovery should be made from the farmers who have

received holdings better than their former holdings will have to be considered. The same question of possible recovery will arise where the new holdings have been increased in size through the displacement of some farmers from the area and displaced farmers will have to be compensated either by cash payment or by the provision of land elsewhere.

This displacement of farmers, which is often inevitable if real and permanent improvement in agriculture is to be achieved in an area of congested population, has important financial implications of its own. Even where developments in urban industry are occurring contemporaneously with the displacement of rural population, there is an obvious distinction between a voluntary movement to the towns and one enforced by compulsory displacement from the land; and it is beyond doubt that in other cases—e.g., where alternative employment has to be found by the development of rural industries or by migration to other agricultural areas—the change will not be effected smoothly without considerable expense. (In this connection, the remarks on the cost of migration in Ireland, which occur in Part II of this publication, are highly relevant and interesting.) A farmer who is dispossessed of his land as a result of the operations has a good case for substantial compensation for disturbance, even though he is given land elsewhere. while if no other land is given him, a claim for loss of livelihood is almost irresistible.

Next may be considered the cost of the actual public operations necessary to consolidation, e.g., survey, classification and valuation of land, construction of roads and other means of communication which are an essential part of consolidation, incidental improvements to the land, the provision of communal amenities, the work of the executive and appellate bodies responsible for the consolidation, and so on. Even though it may be hoped that private persons will work without salary, and that most of the officials engaged in the work will be doing it in addition to their normal duties, yet some extra staff and some special expenditure on equipment and materials will be inevitable, and there will also be considerable out-of-pocket expenses to be met on traveling, etc., by both officials and non-officials. All these expenses will be, in the first instance at least, a charge on the public revenues.

There will also be expenditure which is necessary to restore the agriculture of the consolidated area. Obviously, if the operations demand such radical changes as the removal of farmhouses and buildings to new sites, there will be special expenses on this account: but even where no such radical changes occur, most of the farmers affected, being faced

with what, in effect, is the opening of a new farm, will have to incur all manner of special expenditure which, especially in the case of small farmers, they will not normally be able to meet from their own resources. If the operations have involved the migration of farmers to new lands outside the area, these expenses are likely to be even more important and extensive.

Finally, there may be expenses incurred in engineering operations—e.g., drainage irrigation or protective works, etc.—not directly connected with the actual consolidation but nevertheless integral parts of the whole scheme. It is noteworthy that in the more advanced countries such works are often regarded as essential to the full success of the consolidation.

All these expenses will normally have to be met initially by the consolidating authority or by the permanent departments of government concerned, either by direct payment or by grants or loans to individuals. It is almost axiomatic that, where fragmentation has proceeded to a degree which renders consolidation urgent, the farmers will have few or no resources with which to meet the expenses mentioned. If, with their limited bargaining powers, they are forced to seek funds from private sources, progress may be set back for generations and the good effects of consolidation may be largely lost.

The principle that public funds should be spent only in the public interest and not for the benefit of private individuals, despite its limitations and difficulties of interpretation, is firmly established in most countries, and few public treasuries are likely to accept without demur the wider interpretation of the public interest which may seem natural to the sociologist or the agricultural economist. The question of the possibility of recovering expenditure incurred from the public account is thus almost certain to arise. There is also little doubt that financial assistance towards which no direct contribution has been made and in respect of which no repayment is contemplated is liable to be demoralizing. In most cases, therefore, at least a substantial part of the expenses incurred should probably be repaid by the farmer. Few countries, on the other hand, have found it practicable to recover the whole sum involved.

The following principles are suggested as a rough guide to a division between recoverable and irrecoverable expenditure:

(1) The operation of consolidation as a whole should be regarded as undertaken in the public interest as a means of improving the utilization of the national resources. Salaries,

honoraria and incidental expenses of official or private personnel employed, office expenses and the cost of such necessary incidental work as surveys, valuation, and the preparation of the new record, may then suitably be treated as part of the ordinary expenses of public administration.

(2) Improvements to land of a kind normally conducted by government engineering departments—e.g., irrigation and drainage works, roads, etc., which are to be maintained at the public expense—should be treated as part of the normal work of such departments, and recoveries should be made through taxation or by whatever method is usual for such works. This principle may be applied even though the actual works may be carried out by private agencies operating under contract.

(3) Improvements to land incidental to the consolidation, which are to be maintained by the farmer—e.g., fencing, application of chemicals, etc.—should, unless very elaborate, be treated as part of the necessary expenses of consolidation and not recovered.

(4) Considerable increases in the value of the new holding as compared with the old and expenses in connection with more elaborate improvements of the kind included in item 3 should be recovered at least in part from the farmers concerned through a system of annuities.

(5) Where the acquisition of new rights has resulted from the use of public funds—e.g., where a former tenant becomes owner of land acquired from a previous owner at the public expense—recovery of the expense incurred should be made to the greatest extent possible through a system of annuities.

(6) Compensation due for loss of rights, property, or improvements should, as far as possible, be set off against the value of new rights and property acquired, only the balance being treated as payable or recoverable.

(7) Compensation to farmers affected by the consolidation should usually be paid in cash, and recoveries from such farmers effected through annuities.

(8) Consolidation may frequently involve the construction of new houses, farm buildings, ponds or tanks, etc., either on the consolidated area or on land to which migration has been arranged. If these works are replacements of other

similar works previously owned by the farmer, their construction will usually have to be treated as a public expense, or at the most only substantial differences in value between the new and old works should be recovered. If, however, the farmer did not previously enjoy such amenities, the works can properly be treated as the acquisition of new rights under item 5 above.

(9) Incidental expense due to loss by farmers of standing crops and trees and compensation for operations of cultivation performed in respect of a crop which was not enjoyed should be reduced to a minimum by carrying out the actual transfer after the main harvest and by excluding from the consolidation land planted with vines or trees, wherever these cannot be exchanged for other similar improvements on the new farm and are sufficiently extensive to be treated as a separate enterprise. Some payments on this account will, however, be unavoidable; these should be made in cash and, if possible, recovered from any farmer who benefits.

(10) Special expenditure will often be necessary to re-establish the farmer in his new holding, especially where the settlement of displaced farmers elsewhere is undertaken. The farmer may have to provide himself with new implements or livestock, and there will certainly be unusual expenditure on the materials of cultivation and on the preparation of the new land. In these cases, the normal procedure should be to provide money, or equipment and materials, in the form of loans amortizable over a period of years. Even in relation to expenditure of this kind, however, full recovery has often proved impracticable.

Funds will often be necessary in connection with measures for the prevention of fragmentation or with individual efforts of consolidation not covered by an official scheme. Such funds will usually be required for the purchase of land or for cognate purposes, such as the buying out of other heirs or co-owners. Where suitable institutions for the provision of long-term agricultural credit are in operation, loans of this kind are obviously the business of these institutions, but where satisfactory institutions do not exist, special arrangements may be necessary.

In all cases where recoveries from farmers are contemplated, it is of the greatest importance that the gross annual amount recoverable

from the individual farmer should not be so large as to cripple him or to prevent that improvement and development of agriculture which it is the principal purpose of the consolidation operations to assist. Not only is there grave danger that a single heavy charge—e.g., annual payments in amortization of the value of a holding—may prove to be a serious burden, but it is equally possible that the same effect may be produced by the sum of a number of smaller payments, each moderate in itself, the cumulative effect of which may be obscured by the fact that the payments are due to different departments and agencies. It is, therefore, most important that, in determining the amount and period of recoveries, the whole field should be reviewed in each case. In making such a scrutiny, a general rule may be adopted, that the maximum long-term annual commitments of the farmer should be somewhat less than the rent which might reasonably be charged by a private owner for the same land. In making this calculation, due regard should be paid to local custom in the matter of payment of taxes, water rates, and other public dues payable in respect of the land, and also to any substantial advantage in interest rates which may accrue to the farmer by reason of his creditor being a public rather than a private agency.

Such charges as annuities in respect of land, houses, farm buildings, or improvements should be included under "long-term commitments." In determining the period of such annuities, it will usually be suitable to prefer a long period of small payments to a short period of heavy payments, and, in determining interest charges and payments in respect of insurance against default, to prefer to take the risk of loss from a few defaults rather than to adopt a scheme which on paper fully covers all risks but is likely to hamper the desired improvement in agriculture or to increase the risk of default by honest debtors.

The position in respect of medium and short-term payments is rather different. Here it is important that recovery should be made within the period during which advantage continues to be derived from the value received. Thus, in the case of crop loans, recovery should ordinarily be completed at harvest; in the case of advances for lime, fertilizers, etc., during the period in which the advantage of the application of these to the land still persists; in the case of animals and implements, during the productive life of the animal or implement; and so on. The amount recoverable should be assessed on this basis.

The time of year at which repayments are due may also be important. Usually the best time will be soon after the main harvest, if due care is taken not to force disadvantageous sales of produce to meet the charges.

If, however, there is more than one harvest, or if, as in dairy farming, income is distributed through most of the year, some splitting up of the payments may be desirable. Care should be taken that these extraordinary payments do not prejudice the orderly collection of normal annual dues, such as taxes, and some attention should be given to periods of concentrated personal expenditure, such as festivals, so that undue extravagance on these does not prevent recovery of sums due.

If annual recoveries are at all heavy, arrangements must be made for their modulation to meet annual fluctuations in yield or prices. In countries where rents or land taxes are adjusted to these changes, a ready-made standard for adjusting annual payments already exists; in others, a special scheme may have to be devised; but in all cases it must be recognized that some arrangements to meet these eventualities will probably be necessary and that a definite scheme will always be preferable to purely empirical adjustments and postponements. Two general principles which the writer has personally found to be sound may be mentioned: first, that it is advisable, except in really desperate circumstances, to allow postponement of interest charges as opposed to instalments of the principal of loans and, secondly, that it is most dangerous to allow short-term loans to accumulate from year to year or medium-term loans for the purchase of stock or equipment to remain unpaid beyond the time when the stock or equipment must be replaced.

In the recovery of amounts due on the same account from a number of farmers in the same area, the advantages of some form of co-operative organization are obvious; and where the co-operative movement is well established and its principles really understood by the farmer, full advantage should be taken of its possibilities. Experience in many parts of the world has, however, shown the grave dangers of attempting to accelerate the development of co-operative institutions where their purposes and limitations are not clearly understood. A device which has proved successful under careful supervision, even in rather unpromising circumstances, is the society formed to hold, as an intermediary between the State and the farmers, the land in respect of which recoveries are due. The society is responsible for paying the total amount of the annuities, loans, taxes, etc., to the government, and it recovers the amounts due from its members, the title of land, houses, etc., passing to the farmer only when his annuities have been fully repaid. Meanwhile the society receives all the farmer's produce not required for his own use, sells the produce in bulk, deducts the amount due, and pays the balance to the farmer. In such a society, further developments, such as the cooperative owning of plant, equipment, etc., are also possible.

PART II

National Studies

1. Consolidation of Agricultural Land in Denmark

THE CONSOLIDATION of agricultural land in Denmark was initiated with, and formed an integral part of, the change in agricultural policy which, from the eighteenth century onwards, superseded the old medieval village communities, introduced free social and economic conditions for the farmer, and opened the way to modern methods.

Until the 1750's, Danish agriculture was almost completely dominated by the manorial or landlord system. Only a very small percentage of the land was owned by yeomen-farmers (freeholders); the rest was under the control of manors owned either by the Crown or, more usually, by great and mostly noble landlords. Of this land something like 15 percent was cultivated directly by the manorial owners, while the remainder was held by copyholders for life, who were dependent on the lords of the manor and tied to the soil for part of their lives through a military arrangement. The copyholders' farms were grouped in villages, and both copyhold land and a considerable part of the manorial land were cultivated in common, the three-crop system predominating in the greater part of the country.

During the eighteenth century, strong criticism was aroused and dissatisfaction voiced in Denmark, as in other European countries, against

the existing agricultural system. This criticism was based partly on a sociological objection to the copyholders' dependence on the landlords and partly on the low level of agricultural productivity attained under the existing village system. The two aspects of the problem were regarded as closely interconnected by politicians who carried out the agricultural reforms in Denmark, and thus the economic reforms were carried through with due regard to the interests of the copyholders and with the aim of preserving the medium-sized farm as a typical holding. This fact has had a decisive influence on the area of holdings, on the consolidation of holdings, and on the growth of Danish democracy.

The criticism of the village system, on which the consolidation policy was founded, was analogous to the present-day criticism of agricultural conditions in many countries where fragmentation exists: briefly, the substance of this criticism was that much land was wasted on roads, hedges, and boundaries; that the long distances from the village to the many small plots in the village fields were wasteful of time and money; that the small plots could not be properly cultivated; that the copyholders were unduly dependent on each other as regards the utilization of the land; and that improvements could not be carried out.

It was realized that there were two essentials to a rationalization of agricultural production intended to liberate and preserve the peasant community: one was to abolish the open-field system of cultivation and to consolidate the land belonging to each farm; the other was to break up the village itself, or at least to remove some of the farmsteads to the outlying fields so that each individual farmstead might be placed in or near its own fields, which should as far as possible form a consolidated unit. Both these prerequisites inevitably encountered strong opposition from the copyholders. The village lands differed in quality and type of cultivation, and consolidation necessarily involved some farmers getting better land than others, but the fact that some farmers would have to move away from the villages to which they were bound by social and family ties aroused even greater opposition. This opposition could, however, be largely ignored owing to the system of land tenure. The land belonged to the manors, and the landlord could subdivide and consolidate it in whatever way he found most expedient, provided that he did so in accordance with the law which had been passed.

The first governmental measures to abolish the village community were taken in the 1750's, when acts were passed which made it possible to consolidate the manorial fields, to regulate the relations of the villages towards each other, and to start a general consolidation. These

early public measures did not produce significant results. The consolidation operations carried out on private initiative on the Bernstorff manor immediately outside Copenhagen were of greater importance. On this manor, comprising about 200 hectares of manorial land and about 1,600 hectares of copyhold land worked by 41 copyhold farmers in 3 villages, all the land was mapped, surveyed, and classified, and was then divided into blocks of square or rectangular form as far as the configuration of the land permitted. The blocks were not of equal size, as the principle was that the copyholders belonging to each village should be economically on the same footing after consolidation as they were before it was undertaken; that is to say, the copyholder who received poorer land was compensated by obtaining larger areas. Thus in one village the area of the smallest farm as compared with that of the largest farm was in the ratio 1:2; in the two other villages the ratio was 2:3. The distribution of the farms among the copyholders, after consolidation, was made by lot, and the peasants who had to move from the village received a subsidy for the erection of new buildings. When the consolidation had been carried out, the landlords sold all the farms to the copyholders, who thus became owner-occupiers.

The Counts of Bernstorff—uncle and nephew, and two of the greatest statesmen of Denmark—carried out this scheme from high patriotic and social ideals. The copyholders were not enthusiastic about the consolidation, and indeed the peasants who were to move their farmsteads fiercely resisted the measure; but in the course of a few years the arrangement proved its value, and in 1783 the former copyholders, now owner-occupiers, erected an imposing memorial to the Counts of Bernstorff in token of their gratitude.

This consolidation has been dealt with in some detail because it became the model of much subsequent work. In the years following, a number of landlords carried through on their own initiative consolidation operations on much the same principles as at the Bernstorff manor, and in 1781 the Government combined all existing rules of law on consolidation in a new act, which became the fundamental law for all consolidation of open fields in Denmark. The Consolidation Act of 1781 is a comprehensive enactment which prescribes in detail all rules governing consolidation, the technical details being in accordance with the procedure adopted at the Bernstorff manor and with experience gained there. Its most important provisions are as follows:

(1) Every owner of land in a village is entitled to demand that his land be consolidated and combined into a single lot or,

where this is not possible, into two or at most three lots. This provision applies whether or not the other owners of land are willing to take part in the consolidation.

(2) Before the consolidation takes place, a complete map must be prepared and a valuation undertaken of the village lands. The authorities, in consultation with all the owners of the village land, then prepare a proposal for consolidation of the whole area, whether or not all the owners wish to have their land consolidated, in order that the consolidation of the land belonging to a particular owner may not interfere with a subsequent complete consolidation.

(3) The consolidation must be undertaken in such manner that each owner of land obtains the same economic area as he had previous to the consolidation; i.e., the land is consolidated according to quality, and larger areas are allocated to those who get poor land than to those who get good land.

(4) The quality of the land is evaluated by disinterested peasants from the villages.

(5) All the owners of land are bound by law to contribute to the aggregate consolidation expenses pro rata, according to the size of their land and the immediacy of their interest in the operations. Further, they are required to fence half their property, that is, to contribute half of the expenses in connection with the fencing of a consolidated holding.

(6) During consolidation the land belonging to each farm must be given the most practical shape possible, and the length of the main plot should not be more than three or four times its breadth. In order to obtain the most efficient shape in the new farms, some of the farmsteads may have to be moved from the big villages, and a subsidy is granted by the Treasury for this removal. Moreover, all the farms in the villages are bound to assist in the work of building new farmhouses, making roads, etc.

(7) The land outside the cultivated area of the villages used in common by all the villagers for grazing (i.e., meadows and peat bogs) is to be consolidated and divided into separate areas proportionate to the size of farm in the village.

(8) Maps of the village lands are to be prepared by land surveyors, who are also to prepare the first proposal for consolidation in accordance with the appraisers' valuations. If no agreement on the consolidation can be reached between the

> owners of the land, the dispute is settled by the authorities and, in the last resort, by the Government.[1]

To expedite the consolidation, a later act of 1792 provided that the landlords could charge the copyholders with the interest on the aggregate expenses of the consolidation, which meant that the peasants and not the landlords had to bear the cost of any delay.

Legal rules regarding fencing and drainage assumed great importance in connection with consolidation operations. Although detailed rules of law on these matters were already in force when the Consolidation Act of 1781 was put into operation, and although the act itself contained further detailed provisions, it nevertheless appeared necessary to introduce new and stricter rules. The Drainage Act of 1790 regulated the obligation to clean and keep up watercourses, streams, etc., and provided that every farmer was entitled to drain his land through the land of other farmers, who were to share the expenses of the drainage works in proportion to the advantages which they themselves obtained from it. The Fencing Act of 1794 imposed on every farmer an obligation to fence his land, so that every consolidated farm was protected against intruders, whether man or beast. The expenses in connection with fencing were to be divided equally among farmers of contiguous lands.

Consolidation was carried on at a varying tempo in the years following 1781. The economic situation was the decisive factor, since the measures were somewhat costly in proportion to the low productivity and small incomes of agriculture in the early nineteenth century. In particular, removal of farmhouses from the villages took time, and such removal lagged considerably behind the consolidation. Nevertheless. the process was essentially complete before 1835, as in that year it was estimated that only 1 percent of the copyhold land was still not consolidated.

Experience proved, both in Denmark and in other countries, that it was extremely advantageous to carry out the consolidation process simultaneously with the dissolution of the manorial system, as this made possible a more rational solution without too much opposition from the copyholders. As already mentioned, the ordinary peasant opposed consolidation because he feared that he would get poor or uncultivated land and especially because he did not wish to move from the village to remote fields or to village commons. The experience everywhere in Denmark

---

[1] The remuneration of the work of the surveyors and land-appraisers was fixed in the Act.

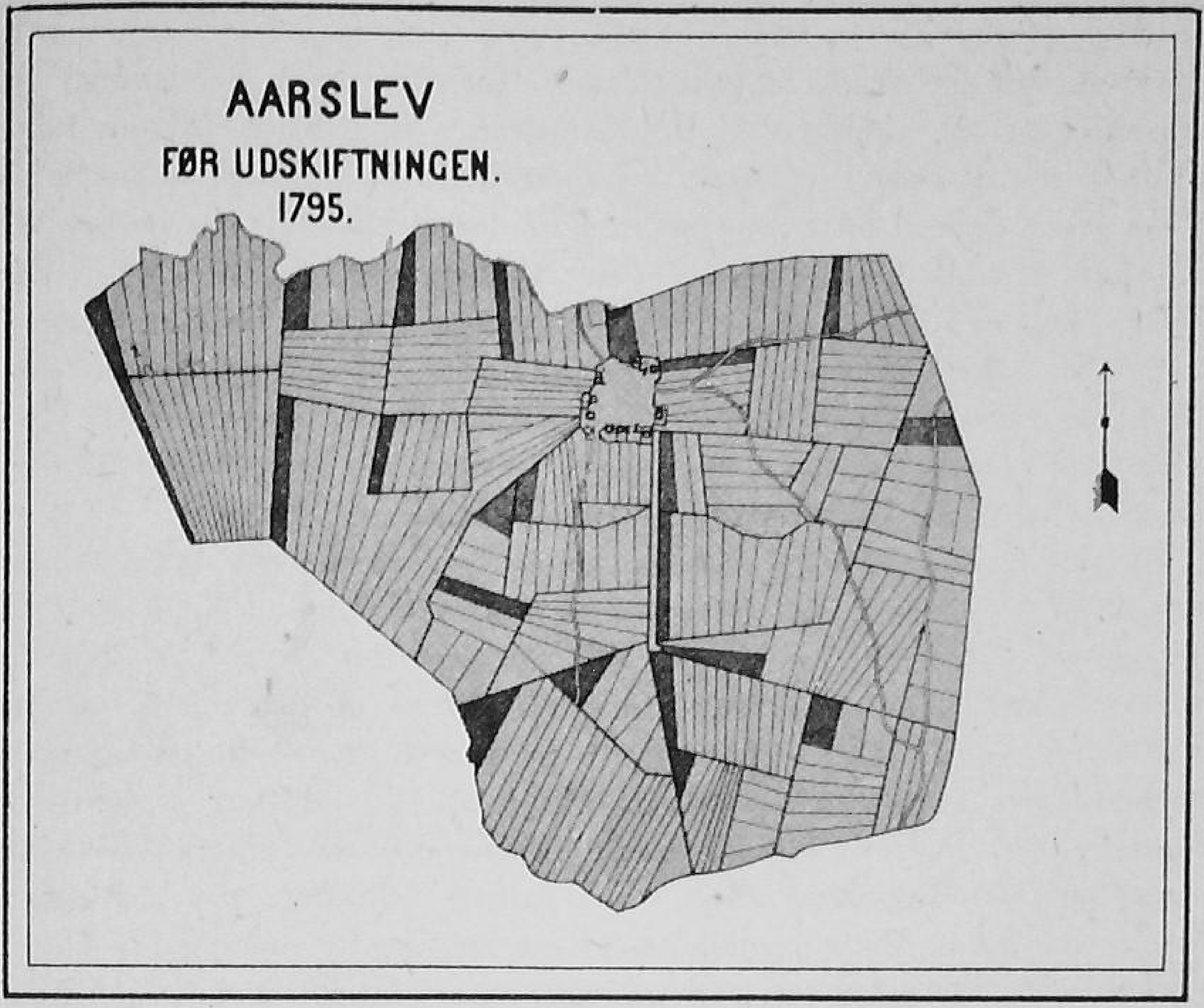
has been that where the consolidation process has for any reason been influenced by the farmer—whether owner-occupier or copyholder—it has been badly carried out, while it has been most successful in places where it has been carried out by landlords who ignored the views of the peasants. Furthermore, it has been found that where mistakes were made during consolidation, so that a farm was given an awkward shape or was divided into several lots, the process of remedying these faults has been extremely difficult and slow.

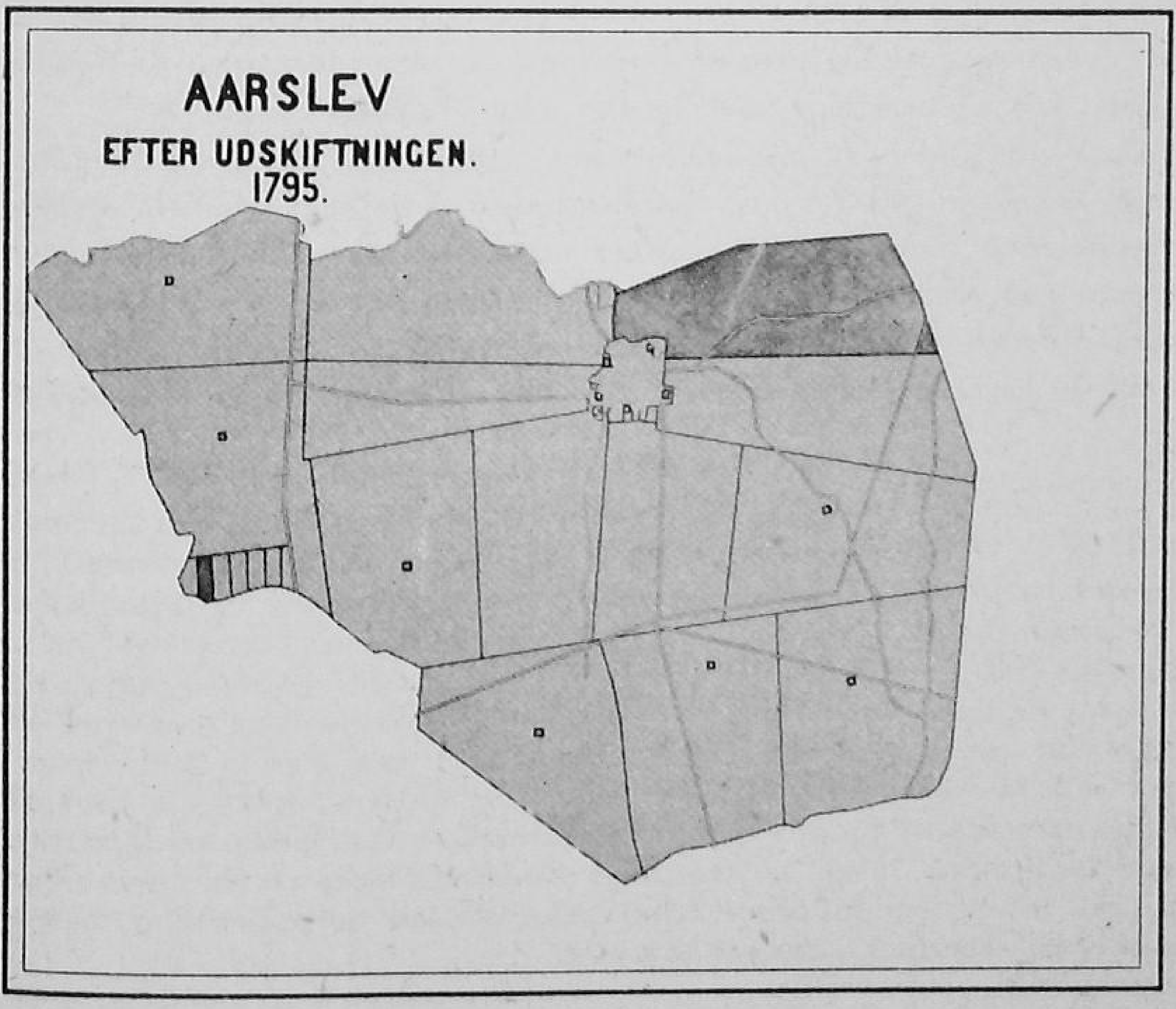
Consolidation was generally most efficient on estates belonging to the Crown, where the plan of the Bernstorffs was largely followed. Between 1784 and 1788, a special government commission carried out a comprehensive consolidation of the Crown estates in the northeastern part of Seeland in pursuance of the act of 1781, and this, like the Bernstorffs' consolidation, became a model for other big landlords. In this case also the former copyholders were made owner-occupiers since the consolidation scheme was carried out in accordance with the Government's general policy to encourage freehold tenure.

These points are illustrated by the accompanying maps. The consolidation of the farms in Aarslev (Maps 3 and 4) and Sludstrup (Maps 5 and 6) were both undertaken in 1792 and must be considered successful. The procedure differed somewhat in the two cases. In Sludstrup, the majority of the farmsteads remained in the village after the consolidation, only two being removed. This caused the so-called "star consolidation," which is particularly disadvantageous in cases where many farms are left in a village of considerable size, because each farm forms a long wedge-shaped strip, narrow near the farmstead and broadest farther away. The consolidation of Aarslev is better. In this case several farmsteads were

→

Maps 3 and 4. Aarslev, Denmark. Farms of the village were consolidated in 1795. Map 3 (above) shows the village domain before consolidation; all the farms are grouped in the village and the land is split into small lots. The dark shading indicates the land belonging to a single farm, totaling 22 plots. Map 4 (below) shows the domain after consolidation; the land is divided into regular blocks; the single lines indicate farm boundaries, the double lines the old village roads, and the small black squares new farmsteads. The village is partly dissolved, the majority of the farmsteads having been moved out into the midst of their land. The dark-shaded block in the upper right-hand corner of Map 4 is the same farm as that shaded in Map 3. In the lower left-hand corner of Map 4 is a number of small parcels of land; this is the village peat-bog, in which each farm got its own lot after the consolidation.


AARSLEV
FØR UDSKIFTNINGEN.
1795.


AARSLEV
EFTER UDSKIFTNINGEN.
1795.

removed, and the shape of each farm is therefore more convenient, irrespective of the situation of the farmstead. As Danish villages have never as a rule been very large, the distance from the farm to the land is not great, even in the cases where consolidation has been less successful.

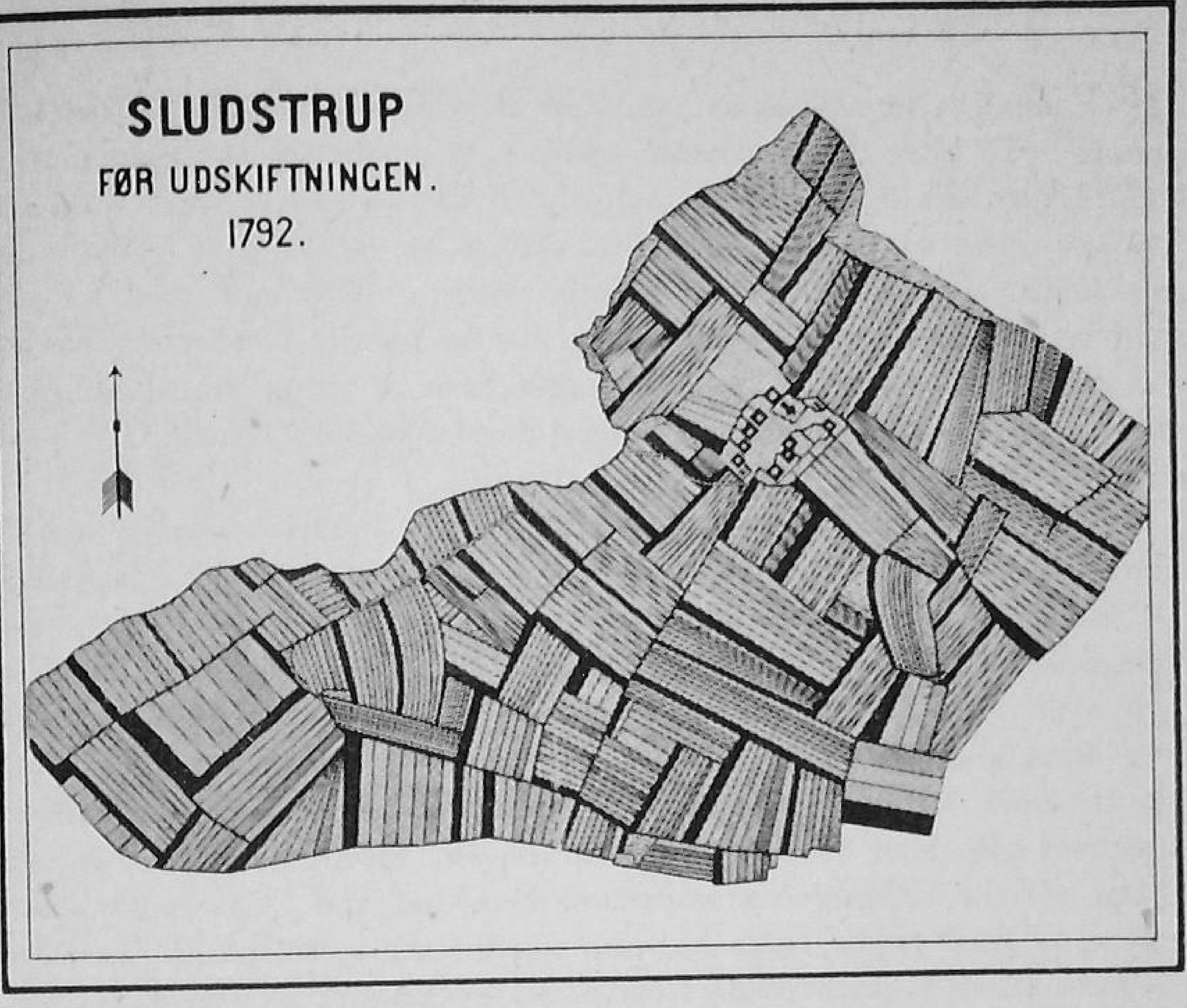
Maps 7 and 8 show a case where the ordinary farmer had a decisive influence on the consolidation and where the result is extremely bad. The copyholders had become freeholders before consolidation was carried out in 1820, and as late as 1917 the original unsatisfactory distribution had not been essentially altered. There are, however, only a few examples of such bad consolidation work as this.

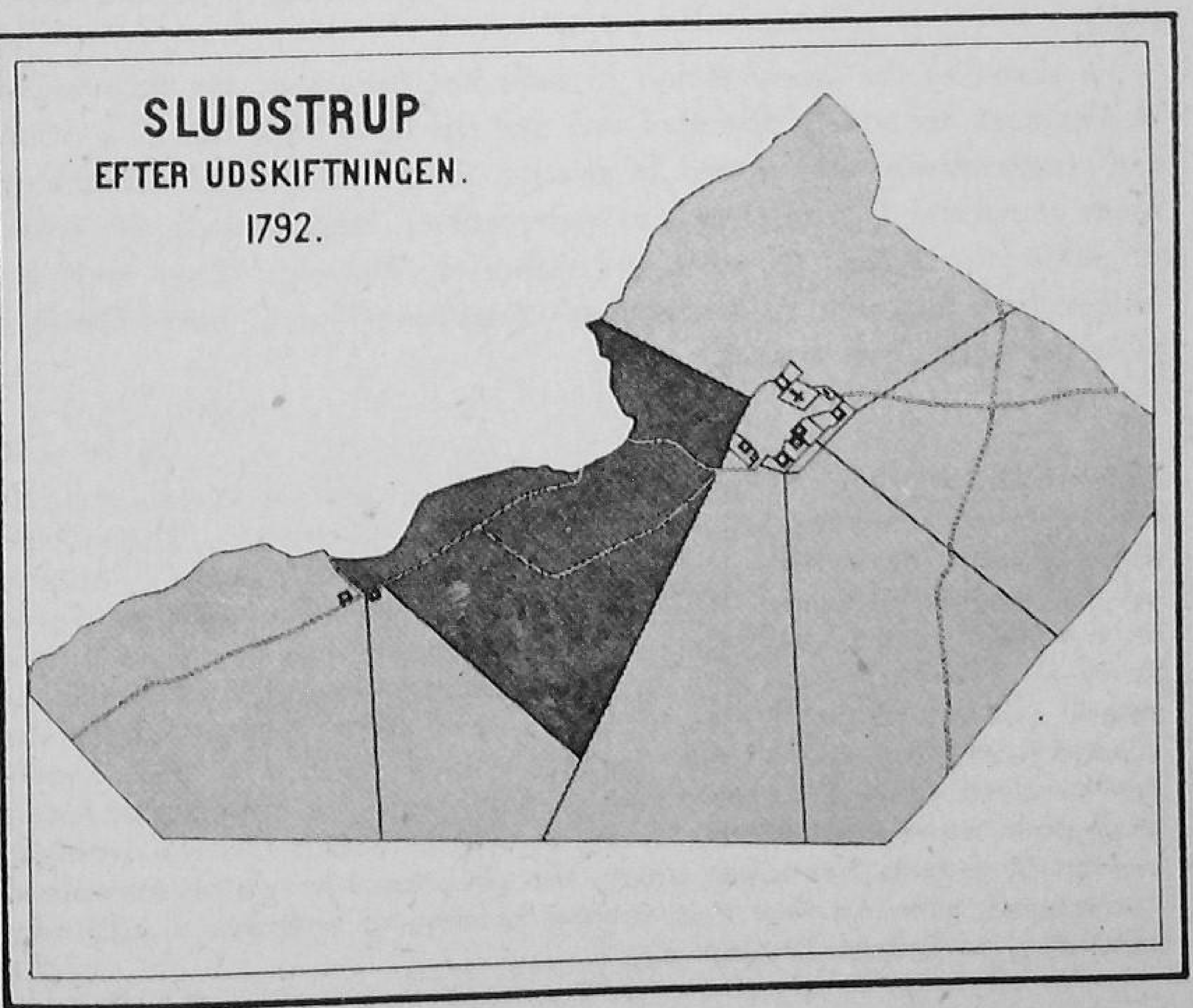
Consolidation under the village system was, as already said, almost completed by the end of 1835, and thereafter the act of 1781 lost its importance. This did not mean, however, that the process of consolidation ceased. Immediately after the dissolution of the village system it became clear to the farmers that considerable economic advantages derived from a practical form of consolidation, and they have tried constantly to improve on the existing consolidation. Such improvement has, however, been effected on private initiative, the particular farmer improving the consolidation of his holding by moving his farmhouse, or by the purchase, sale, or exchange of land. It will be easily realized that this is both a slow and difficult process, since it is dependent on the state of the existing buildings, on other farmers' willingness to buy, sell, or exchange land, on the state of trade, etc.

In South Jutland, consolidation was carried out less efficiently, because, though in this province the dissolution of the common-field system of cultivation took place at a rather early date, the villages continued to exist and each farmer was often allotted land in five to ten or even more different places on the village lands. On an ordinary farm of about 30 hectares, it is estimated that the cultivation of these scattered

→

Maps 5 and 6. Sludstrup, Denmark. This village was consolidated in 1792. Before consolidation each farm had its land distributed in about a hundred lots in the village domain, which were amalgamated into single blocks. In this case the consolidation was carried out on a principle differing somewhat from the one applied in Aarslev (Maps 3 and 4). As the farms were only seven in number, it was preferred to leave the majority of the farmsteads on their old sites in the village, and only two were moved out. The resulting farm blocks are thus of a less convenient shape, and the distances to the fields are greater. From both maps, it will be seen that the farm blocks varied somewhat in size, the consolidations having been carried out according to the quality or economic value of the land.


SLUDSTRUP
FØR UDSKIFTNINGEN.
1792.

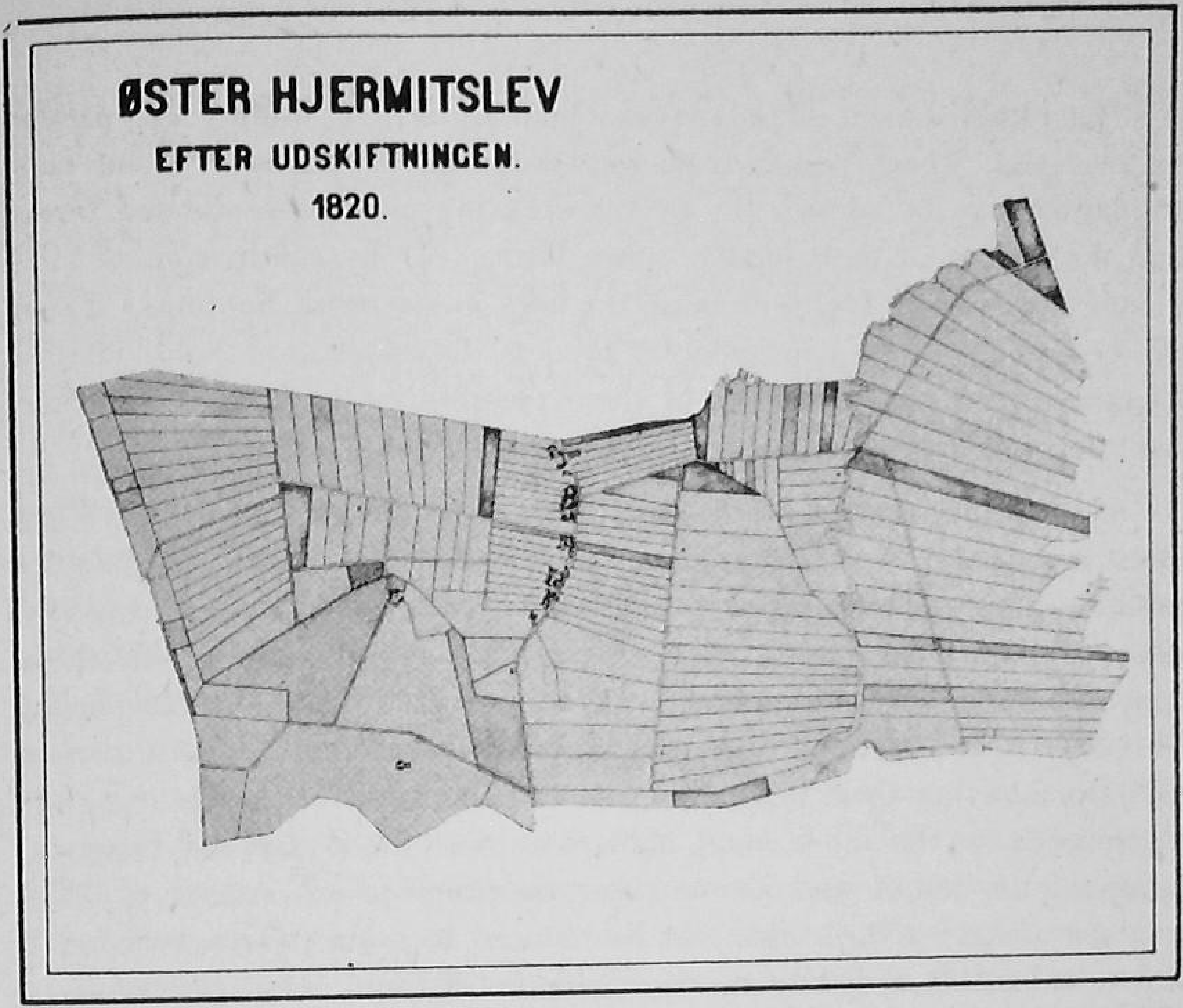

SLUDSTRUP
EFTER UDSKIFTNINGEN.
1792.

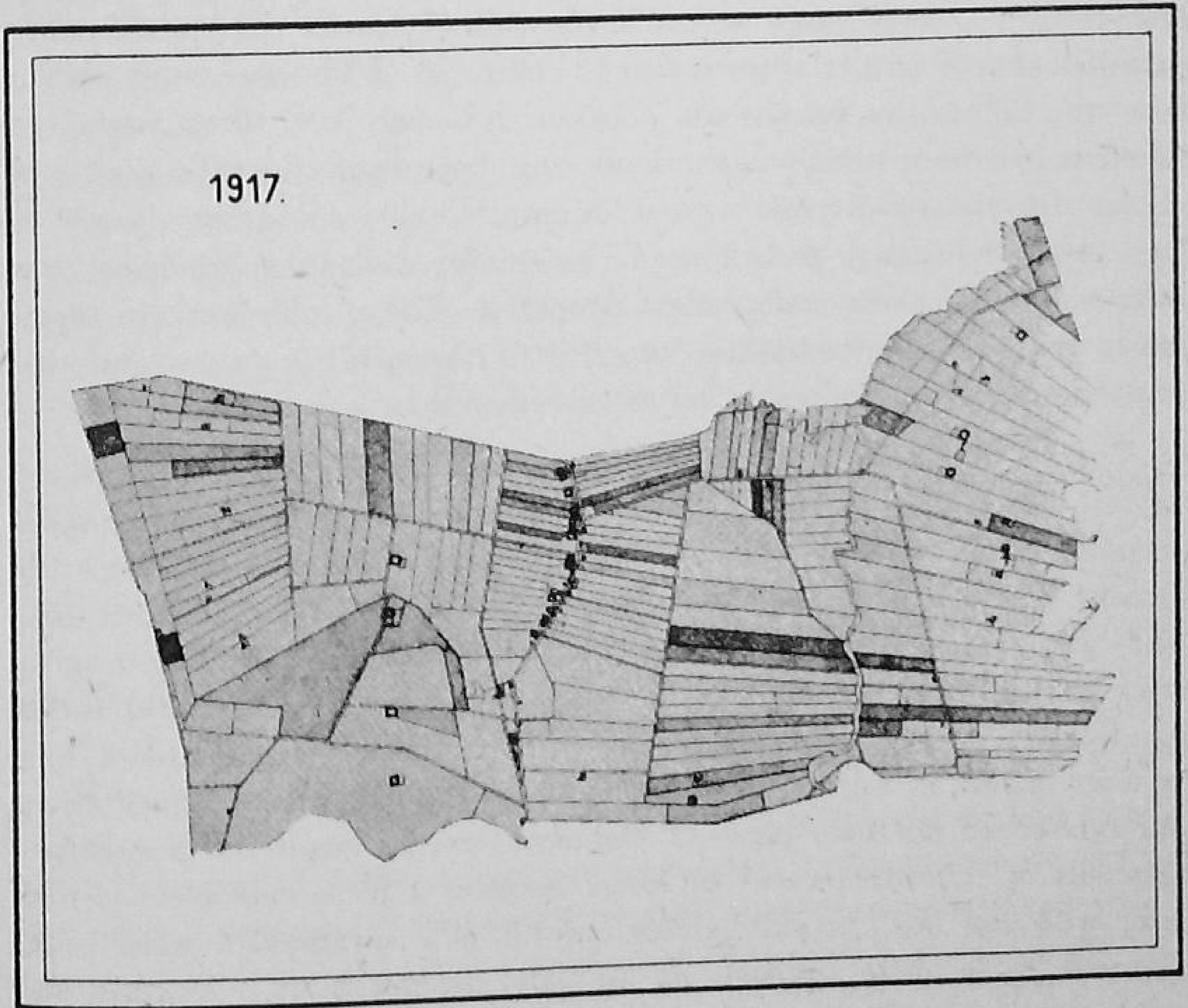
fields requires an additional hand and an additional team of horses annually. To solve this particular problem, a special act has been passed which provides that, when a majority of the owners of land within a village agree to consolidate their holdings, a recalcitrant owner may be forced to participate to a certain extent. Until now, the act has not been applied to any great extent, but the heavily increased expenses of production, especially the high wages, have in recent years awakened an interest in the matter, and several consolidation schemes have been carried out or are in course of preparation.

Since the advantages of consolidation have become apparent to all farmers, and opposition to moving farmsteads from the villages has ceased, it is now an invariable rule that every new holding established by the purchase of land from existing farms or by cultivation of waste land is given the most regular and convenient shape possible and that the farm buildings are placed as conveniently as possible within its area. This has applied, for example, to the Government's scheme for the establishment of new small holdings: the small holders receive their land in one piece and the buildings are erected on the actual land. The construction of many good public roads has also assisted this development, as there is now access to such roads from most agricultural properties in Denmark.

A result of the consolidation of land has been that the farmhouses in Denmark are widely dispersed and that the farm buildings as a whole are comparatively well placed in relation to the farms and also in respect of natural features (such as watercourses, lakes, woods, etc.) and of public works such as roads and railways. The old village may, for all practical purposes, be said to have disappeared or to have dwindled to a few farms and houses.

Maps 7 and 8. Oster Hjermitslev, Denmark. These maps demonstrate the importance of rationality in the original consolidation. The village fields of oster Hjermitslev were consolidated in 1820 (Map 7, above) by the freehold farmers themselves. Having been unable to agree on a rational consolidation scheme, the farmers' land remained split up in 12 different places all over the village domain, and all the farmsteads but two were left on their old sites in the village along the village road. Map 8 (below) shows the village domain in 1917, nearly one hundred years after the consolidation. Though a number of farms have been moved out of the village onto their land and some amalgamation of parcels has taken place, the situation has mainly remained unchanged, proving that it is a slow process to improve a bad consolidation by private initiative. →


ØSTER HJERMITSLEV
EFTER UDSKIFTNINGEN.
1820.


1917.

The establishment of good consolidation is one thing. Its preservation—and, where possible, its improvement—is another. Good consolidation may be ruined (1) by the breaking up of consolidated farms and the adding of their land to other farms, (2) by subdivision of land among heirs, and (3) by dividing the land in too small holdings. From the beginning of the consolidation process, statesmen and politicians in Denmark have paid attention to these possibilities, and legal provision has been made to maintain the integrity of existing farms.

As the fundamental idea underlying the abolition of the village system was to preserve the peasant class and peasant farms, acts were passed which tightened up the old law in this respect and introduced new categorical provisions prohibiting the landlords from abolishing copyhold farms or from adding copyhold land to the manorial fields. The copyholders were thereby protected from absorption in the manors and from having their land amalgamated into larger holdings. It was recognized, on the other hand, that there was the danger of fragmentation of the farms, and it was therefore provided by an act of 1810 that the area of a farm must not be reduced to a size which was insufficient to enable a family to earn a decent living. This provision of law, though several times amended, is still in force. The act further provided that a farmer who wished to sell some of his land must obtain from the authorities provisional sanction for such sale; that, when the sanction had been obtained, the land must be measured and a map and a plan for the subdivision prepared; and, finally, that every piece of land must be valued according to its quality. Each subdivision was then considered as an independent property. These rules have in themselves gone far to protect the integrity of the existing farms and this protection has been increased by means other than legislation.

By law and custom, copyhold farms were thus efficiently protected against absorption and amalgamation; on the other hand, the owner-occupier farms were not equally secured against fragmentation, since the owners were permitted, for example, to divide their farms among their heirs and to sell their land. Thus the prevailing policy of encouraging freehold tenure might threaten the integrity of existing freehold farms by division among heirs or by sale. This division among heirs has, in many places in Europe, been the cause of the extensive fragmentation, but this could not take place in Denmark, even though the *per stirpes* principle of inheritance was in force, because a farm could, in accordance with the law, be subdivided only if new farmhouses were built, and not by a mere division of the land among heirs. To this was

added the very important fact that it became customary for only one heir to take over a farm. This was achieved by providing by a special act of 1769 that a freeholder could devise his farm to one of his children simply by recording his intention with the local authority, whereupon, if no will had been made, one of the heirs was entitled to have the farm conveyed to him by the authorities on condition that he paid to his co-heirs their share of the value of the farm. In the course of time, however, the more important custom grew up for a farmer during his lifetime to arrange the matter of inheritance with his heirs. Originally this was done by conveying the farm to the heir in return for full maintenance of the farmer and his remaining family. The procedure is now often varied by the heir buying the farm outright from the farmer at a privileged price. It is quite an ordinary procedure for the owner to divide his farm among two or more heirs, but in such case it is customary for division only to take place where it results in the establishment of new self-sufficient holdings, and therefore only the biggest farms have been split up in this way. In these cases the practice has rather encouraged consolidation, as it is generally the outlying or separate parcels of land which are given to these children.

The formalities in connection with the subdivision of land and adjustments in the law and customs of inheritance have therefore been a bulwark against the breaking up of consolidated agricultural land on inheritance.

The danger of fragmentation was not, however, completely excluded by the above rules of law and custom, since the establishment of holdings too small to provide a livelihood for a family was not thereby completely prevented. In fact, in attempting to protect badly situated agricultural workers, a provision in the Consolidation Act of 1781 as amended in 1792 encouraged this tendency. In the old village community, some of the land workers had the right to cultivate a small area and to graze a few animals on the common lands. This right was eliminated by consolidation, but at the same time certain advantages were accorded to landlords and farmers if they established small holdings of up to 2 hectares or added the like area to landless houses. It was even permissible to break up farms if the land were added to landless houses or if small holdings were thereby established.

The development of too small holdings became considerable in the early part of the nineteenth century, partly because more intensive methods of cultivation made it possible to support an increased number of agricultural workers on the same land, and partly because the population increased greatly and sought employment in the country. However, this

fragmentation never became dangerous, in the first place because, Denmark being then rather thinly populated, there were possibilities of establishing many independent new holdings by the subdivision of existing farms and by cultivation of land which had hitherto lain waste; in the second place because this fragmentation took place sporadically all over the country, so that no too great concentration of small holdings in one place resulted; and in the third place (and this was the most important reason) because this fragmentation stopped of its own accord about 1860, as the emigration from the rural districts increased both abroad and to the towns, where industry was undergoing rapid development and was able gradually to deal with practically the whole excess of rural population.

Nevertheless, the numerous too small holdings which were established in the nineteenth century have been a problem to Danish agricultural policy. Since 1909 the Danish Land Division Laws have made it possible for owners of small holdings to make these self-supporting through the purchase of land with the help of cheap loans granted by the Treasury, but this measure has not been effective in solving the problem of small holding, and proposals are at present under consideration for the introduction of further legislation, designed to make it possible to turn the small holdings into self-supporting farms, either by amalgamation or by the purchase of land from other properties. It had been proposed that the problem should be solved by compulsory purchase of land from other properties, but this idea was abandoned owing to the injustice and economic damage which might be caused thereby to existing consolidated holdings.

To sum up, consolidation of agricultural land in Denmark as a public activity has largely become a matter of history. It began in the eighteenth century with the abolition of the manor-and-village systems, and it was in the main completed before 1850. When once the opposition of the peasants, particularly against the removal of the farmsteads from the villages, had been overcome, the process quickly became generally recognized as economically advantageous, and farmers tried, and are still trying, as opportunity offers, to improve the existing consolidation. It has also become a matter of course that newly established holdings should be given the best possible shape and the buildings placed in the most convenient manner on the farm. The present law governing division of land and inheritance has been instrumental in preserving the integrity of existing holdings and in preventing fragmentation.

The establishment of too small holdings gained some ground in the nineteenth century, but this process was stopped at an early date by the exodus from the rural districts, made possible by the alternative opportunities especially in urban industry for the employment of the growing population. The too small holdings which still exist constitute a political problem in agriculture, the solution of which is being attempted by their amalgamation or by the purchase of additional land wherever this is possible without damaging the integrity of existing holdings.

The reasonably effective consolidation of agricultural land into sizable holdings, which was carried out at an early period, may be said to be an essential cause of the high state of development of Danish agriculture, the high standard of living of the Danish farmer, and the prosperity of the country as a whole.

2. Consolidation of Agricultural Holdings in France[1]

THE WELL-KNOWN DISADVANTAGES of the fragmentation of farm holdings become more serious in direct ratio to the smallness of the farm. That the situation of France in this respect is peculiarly bad, the following information extracted from the proceedings of the Agricultural Inquiry of 1929 bears witness. Of 55 million hectares of metropolitan territory, the cultivated area accounts for 34 million hectares, including 20 million hectares of arable land. By types of holdings, the land is roughly divided as follows:

[1]Translation of French original.

Worked by owners	27 million hectares or 60 percent
Worked by tenants	13 million hectares or 30 percent
Worked by métayers (share croppers)	4 million hectares or 10 percent

The total number of holdings is 3,655,895 of which 2,728,891 are worked by owners, 728,131 are tenancies, and 198,783 are *métayages.*

The distribution by area per 100 holdings is as follows: 72 under 10 hectares in size; 25 between 10 and 50 hectares; and 3 over 50 hectares. The average area of an agricultural holding in France is only 11.64 hectares, and the average for holdings of less than 50 hectares is only 8.54 hectares. For half a century there has been a very marked reduction in the number of small holdings, with a corresponding increase in moderate and large holdings. Nevertheless, France remains a country of small and medium-sized holdings.

The holdings are usually very much fragmented, fragmentation being defined as the state of division of the holding into several discrete plots of cultivation. In owner-cultivated holdings—the most frequent type in France—the whole of each plot of cultivation is always held by a single owner and this is also true of the majority of tenant holdings and holdings in *métayage.*

A simple examination of the cadastral maps reveals that fragmentation occurs in the most diverse regions. The map shows, in fact, a network, sometimes sparse, of roads, enclosing a multitude of small plots, often irregular in shape and for the most part cut off from the roads. In this veritable chessboard, the plots cultivated by the same agriculturist, which together form his holding, are not grouped in a single lot around the farm buildings or even in a small number of well-distributed lots, but are on the contrary scattered, as if haphazard, over the whole area.

Closer scrutiny of the cadastral maps often shows more or less important regional variations in this fragmentation, which may generally be classified in three principal types. The first type, which occurs in the north and east of France, consists predominantly of long rectangular plots and is ordinarily associated with the grouping of farmhouses in villages. The second is characteristic of wooded areas and consists of irregular plots almost always associated with dispersed farmhouses. The third, which is especially common in the Mediterranean South, consists of scattered plots of irregular shape, associated with grouped farmhouses. In much of the country, however, these types are found together, owing to differences in the agricultural land itself, and the degree of fragmentation of holdings may vary greatly within a single department.

The results of an inquiry made some fifty years ago into the value of cadastral records give an idea of the situation. On a total surveyed area of 52 million hectares, more than 151 million survey plots were distinguished, which gives an average area of only 0.35 hectare per plot. This area corresponds with the old unit of land measurement, the name of which varies from region to region, but the area of which represents a day's work with the means of cultivation then in use.

This average area shows significant variations from one department to another. It is as great as 0.95 hectare in the Landes and as low as 0.17 hectare in Loire-Inférieure, with intermediate figures of 0.22 hectare in Seine-et-Marne, 0.37 in Maine-et-Loire, and 0.66 in Cher.

The true degree of fragmentation, however, is indicated by the area of the *ilôt de propriété* (continuous block of property), which may be defined as the group of contiguous survey plots belonging to one owner. The same inquiry gave 0.85 hectare as the average area of the *ilôt de propriété*, but this average conceals great variations, since the area does not exceed 0.25 hectare on the Meuse but reaches 17.54 hectares in the Landes.

In a group of twenty departments in the region of Paris and in the east and north of France, which is a region of grouped farmhouses and open fields often without clearly defined boundaries or with only simple boundary marks, the average area of the *ilôt de propriété* is less than 1 hectare and fluctuates around 0.60 hectare. In the wooded western and central regions, on the other hand, its average area is higher, namely, from 1.5 hectares to 4 or 5 hectares. On these lands the houses are dispersed, fields in the same holding are generally contiguous, and plots are almost always provided with fences forming a continuous boundary. In the valley of the Rhone and in Languedoc and Provence, the average area of the *ilôt de propriété* is less than 1 hectare and the region falls in the third type of land indicated, i.e., open fields, often with dispersed farmsteads. The other regions show irregular variations in the average area of the *ilôt de propriété*, which is however almost always more than 1 hectare, though in the west Charente, with 0.35 hectare, is exceptional, as, in the central region, is the group Puy-de-Dôme and Haute-Loire with 0.40 hectare. Finally, Loire-Inférieure in a heavily wooded region likewise shows an average area for the *ilôt de propriété* of only 0.45 hectare. Without attaching any absolute value to these indications, the conclusion may be drawn that in more than one-third of the departments the average area of each continuous block of property is less than the minimum required for mechanical operations and

that even in the rest this minimum is scarcely attained. It is only in the compact estates in wooded regions that the area seems to exceed this minimum. Here what must be considered is no longer the size of the block of property but the size of the field, which is almost always enclosed and has an average area of about 0.5 or 0.6 hectare. In certain extreme cases, fragmentation has led to what can only be described as a veritable pulverization of the holding, which presents the cultivator with a situation in which cultivation is impossible and often results in the reversion to waste of at least the poorer and more distant plots. One may, therefore, say that the whole cultivated agricultural area of France suffers from fragmentation to a greater or lesser degree.

The disadvantages of fragmentation begin to make themselves felt as the active farming population decreases, and tend to become unbearable with the introduction of agricultural machinery and especially of mechanical traction, the use of which is difficult in small and badly shaped fields. It may be said in general that in France, due regard being given to the small average area of the holdings, each field should have a minimum area of 1.5 to 2 hectares, should present a furrow length of at least 200 meters, and should abut at each end on a road passable for wheeled vehicles.

The area needing consolidation in France may be taken to be at least 18 million hectares of arable, waste, or heath land. The urgency of the operation obviously varies with the type of land, but the opinion may be ventured that an important improvement in the present situation will be attained when the 10 million arable hectares situated in the region of open fields and houses concentrated in villages have been consolidated. This area, for the most part, falls in a score of departments in the north and east and in the Parisian basin. The Commission for the Modernization of Rural Equipment under the Monnet plan in 1946 estimated the area of arable land requiring urgent consolidation in these regions at 5 million hectares.

The Methods Employed

Although fragmentation in France is an established fact, the disadvantages of which have been denounced for several centuries, no special legislation existed before the law of 27 November 1918, known as the *Loi Chauveau*. Nevertheless, some isolated operations of consolidation were carried out in the eighteenth century, and in the nineteenth century in Lorraine the operation called "general demarcation" (*Aborne-*

ments généraux), though not a true consolidation of plots, brought about some improvement in the condition of holdings through the setting up of boundary marks, the rectification of crooked and irregular boundaries, the partial elimination of isolated plots, the building of roads, and mutual exchanges of land which made possible the combination of plots. These operations of demarcation continued until the war of 1914-18, but they remained incomplete operations because no radical cure was provided for the dispersion of plots.

On 27 November 1918, the first law dealing definitely with consolidation was promulgated. Its provisions permitted proprietors to set up syndicate associations, in conformity with the laws of 21 June 1845 and 22 December 1888, to carry out the consolidation of holdings and connected improvements to land. Certain conditions requiring the concurrence of a majority in numbers of farmers and in area were imposed which often caused insurmountable difficulties to the formation of these associations. Once an association was formed, the syndicate conducted consolidation operations, disputes which occurred among interested parties being settled by a Commission of Arbitrators presided over by the *Juge de Paix*. On completion of the operations, the consolidation had to be accepted by a majority of the proprietors. The decree law of 30 October 1935 effected certain improvements in this legislation by making the consolidation absolute after the decision of the Commission of Arbitrators, without requiring the formal agreement of the general assembly of proprietors.

In spite of difficulties inherent in the constitution and functioning of the associations, which were organs ill-adapted to consolidation operations, this set of laws was applied to some extent, and an area of 55,000 hectares in about 120 communes was thus consolidated. This poor result is partly explained by the coexistence of simpler legislation, namely, the law of 4 March 1919, which applied only to regions devastated by the war. This last enactment allowed the parties to proceed either by redetermination of old boundaries confused or destroyed as a result of the war or by a new distribution. In either case, the executive body was a "Communal Commission" composed of ex officio members and of members chosen by the Prefect. The cases were first brought before the Communal Commission and then before a single Departmental Commission for the whole department concerned instead of a special Commission of Arbitrators for each case, as under the law of 27 November 1918. This simpler legislation, even though limited to devastated departments, resulted in the consolidation of an area of 570,000 hectares in 565 communes. Under these two laws a total area of 625,000 hectares of land situated in 685 communes

was consolidated, an interesting result, though inadequate to the needs of the situation. These achievements demonstrated clearly how much more flexible were the provisions of the law of 4 March 1919 than those of the law of 27 November 1918 and of the decree law of 30 October 1935.

The recasting of these two enactments was studied from 1938 onwards and was effected in the law of 9 March 1941, brought into force by the order of 7 July 1945. This enactment now regulates all consolidation operations in France, and an administrative regulation, dated 7 January 1942 and brought into force by the same order, prescribes in detail the manner in which the law is to be applied. Under the terms of this legislation, the conduct of the operations is entrusted, as in the law of 4 March 1919, to a Communal Commission which includes both officials and working owners of the commune under the chairmanship of the *Juge de Paix*. This Communal Commission, after having decided to undertake consolidation operations, appoints a surveyor to carry out the consolidation. The Commission possesses important powers and has authority to take all steps likely to assist in the rational use of the land. It was only possible to give such powers to this Commission, on the one hand by reason of its composition and on the other hand because its actions are controlled by a Departmental Commission, which functions as an appellate tribunal and is charged with the examination of all complaints and representations which the parties may make in the course of the operations. The owners have also a right of appeal to the Council of State on the ground that the law has not been observed. Thus, though the rights of the proprietors are subjected in the public interest to the constraint necessary to achieve by consolidation a definite increase in the value of rural holdings, they are protected against violation by the Communal Commission. Under the old legislation, the consolidation of holdings was considered primarily as an operation of redistribution of existing plots. The new legislation, on the other hand, aims not only at the rearrangement of small, scattered plots into large, well-grouped lots, but also at bringing together, as far as possible, the land and the farm buildings.

After having appointed the surveyor, who, subject to the control and under the direction of the Department of Rural Engineering, carries out the technical operations, the Communal Commission effects that portion of the demarcation which affects the whole commune, namely, that of means of communication and of portions of the area to be excluded from consolidation. It then carries out an inquiry into existing ownership and rights. This investigation is necessary to determine both the nature and the extent of each person's rights and the value of his share, so that

the consolidation may result in his obtaining equivalent value for this share. At the same time the Commission proceeds to the classification and valuation of properties in order to establish equivalent values in immovable property liable to exchange. This valuation is a most important operation, on the result of which depend the reasonableness and accuracy of the whole operation. The classification and valuation are the subject of an inquiry during which the parties are called upon to present their views. Complaints presented are at once examined by the Communal Commission and, if satisfaction is not obtained, the parties may take their case before the Departmental Commission.

The surveyor next carries out a series of technical operations, including a study of the alignment of new roads and topographical work. The new road system, the alignment of which is of great importance, must be such as to ensure that all the plots are readily accessible. The topographical survey includes the surveying of physical features (water courses, communications, hedges, embankments, ditches), the boundaries of the various plots, the limits of the different classes of land and in general of all details affecting the formation of the new plots, which are not however demarcated at this stage. The surveyor next proceeds to provide a basis for the redistribution of plots by calculating the total value of the area available for redistribution among all proprietors (i.e., the total value of the area covered by the operations, less the value of the area occupied by the new roads to be made) and the value of the individual area to be assigned to each one. He thus obtains a coefficient of conversion which enables him to calculate the area to be assigned to each party. The Communal Commission then carries out the consolidation in accordance with the following principles:

(1) The new grouping should be such that, when compared with the old plots, the new plots have a similar value for cultivation and a similar arrangement, and are situated at the same mean distance from the central point of the enterprise.

(2) Except for special reasons, the new grouping should maintain under the old ownership plots (e.g., vineyards, orchards, woods, etc.) the exchange of which is made difficult or impossible by the nature of their cultivation.

(3) The grouping should be as compact as possible consistent with maintaining in each new share an approximately similar distribution among the value classes as in the old holdings.

(4) The grouping should take out plots belonging to proprietors not resident within the area, and reassemble them on the out-

skirts of the area as near as possible to the owners' respective holdings.

The redistribution is next demarcated on the ground, and a further inquiry is held under the same conditions as in the case of the inquiry into the classification of the land. When the scheme has been modified to the extent made necessary by decisions of the Departmental Commission and the Communal Commission, the new distribution of plots becomes final and the administrative measures necessary to complete the operations are carried out, that is to say, the report on the operations is drafted, the actual transfer of rights is effected, and the record is prepared. The results of the operations are then incorporated in the cadastral records.

To ensure that the results of the consolidation are conserved, the law requires the approval of the Departmental Consolidation Commission to subsequent subdivision of consolidated holdings.

An essential characteristic of this legislation is the new meaning which it gives to consolidation, which is no longer considered simply as a rearrangement of plots, but as a complete operation designed to secure for the new holdings the best possible arrangements of access and drainage. The law makes it possible for the Communal Commission to devise land improvements incidental to consolidation, and provides for the carrying out of such improvements and also for the construction of roads and for the compulsory setting up of a Land Association consisting of all the owners of land within the consolidated area. The expenses of consolidation operations are met by the State, though a certain part of the expenses (at present 20 percent) is recovered from the owners after the completion of the operations. The administration of the law relating to expenses of consolidation is in the hands of the Department of Rural Engineering.

The Results Attained

Operations under the law of 9 March 1941 began only in 1943, the year in which the first credits were included in the budget of the Ministry of Agriculture. The number of applications for consolidation was at once considerable and has continued to increase. In January 1948, without special propaganda by the administration, it had reached 2,700 affecting an area of about 2.1 million hectares. As would be expected, these applications are most numerous in the departments of the north and east and in the Paris basin where the average area of continuous lots is less than one hectare and where measures of consolidation under the law of 4 March 1919 were numerous. In the other regions, where such operations

were practically unknown, applications have been less numerous. The State has taken appropriate action to meet these important demands. The credits granted to the Ministry of Agriculture for this purpose, at first small, have increased until they amounted to 2,000 million francs in the budget of 1948. At the same time the number of surveyors specially designated for the work of consolidation has constantly increased. This number exceeded 600 in January 1948 and should reach 1,000 in the near future, a number which should make possible the annual consolidation of 1 million hectares, if sufficient funds are made available. The average duration of each operation is two years and the results achieved at the end of 1947 amounted to 100,750 hectares, representing the area of operations undertaken in 1943, 1944, and 1945, the events of 1944 having delayed the completion of these early cases. It is estimated that by 1952 more than 2.5 million hectares will have been consolidated, a very satisfactory result compared with the total of 550,000 hectares dealt with under the previous legislation. During the twenty-two years from 1918 to 1940, the number of operations which had to be abandoned by reason of the opposition of interested parties was insignificant, and few operations now take longer to carry out than is estimated.

Consolidation operations have been pursued actively in the departments of the north and east and in the Paris basin, where the farmers approve and where the results of consolidation are, so to say, immediate. In other regions achievements are less numerous and primarily for demonstration purposes. It is perhaps unnecessary to emphasize that, in view of the great diversity of the lands of France, if results are to come up to expectation, the general principles established by the law must be freely adapted to the particular conditions of each region.

3. Relief of Rural Congestion in Ireland

THE LEGISLATIVE MEASURES enacted with a view to the enlargement and consolidation of uneconomic holdings in Ireland are contained in what is known as the Irish Land Purchase Code which consists of a series of land acts passed between 1870 and 1946. Prior to the enactment of these acts, the ownership of the land was in the hands of a small number of landlords under whom there existed, in a condition approaching serfdom, some half a million families who occupied their holdings as tenants at will, enjoying no security of tenure or protection against arbitrary increases in their rents and, on eviction, entitled to no compensation for improvements made by them.

The historical causes which had produced this condition of things are well known and, for our present purpose, need not be recounted; but it is relevant to note that, while concentration of ownership was made secure through the system of undivided succession, the political and economic conditions of the early nineteenth century encouraged excessive subdivision of the tenants' holdings and a progressive increase in the number of tenants. The political system gave considerable power to the landlord who had a large number of tenants, while the economic conditions of the time suited small-tillage farming. Later, under the influence of free trade and expanding markets for cattle, small-tillage farming tended to be superseded by an era of pasture and large farms. Accordingly, the tenants of small holdings were dispossessed wholesale by landlords who desired to consolidate such holdings into large economic farms with extensive tracts of pasture. These "clearances," as they were termed, were made ruthlessly, without regard to the future of the dispossessed tenants, and in many cases irrespective of the payment of rent. Emigration — the only resource for the dispossessed tenants — was greatly increased, but it could not of itself solve their problem, and the natural results of the clearances were retaliatory outrages and constant agrarian disturbance.

The "clearances" affected the part of the country that was suitable for grazing far more than the poorer and lighter lands, and the overcrowded population on these poorer lands (resulting among other causes from the excessive subdivisions during the earlier period of profitable tillage farming) constituted in the changed economic conditions a problem of chronic rural congestion. This was especially the case in the extensive areas of infertile lands in the western portion of the island which have in con-

sequence come to be known as the "congested districts." Congestion was, however, by no means confined to these districts, but was to be found in scattered areas all over the country.

The measures of general reform contained in the earlier land acts of 1870, 1881, and 1885 (with the amending acts of 1887, 1888, and 1889) were not aimed directly at the problem of congestion. Their main purpose was to concede to the tenants essential reliefs of free sale, fixity of tenure, and fair rents, and also a measure of voluntary land purchase, financed out of State funds, enabling the tenants to purchase the fee-simple interest in their holdings by means of advances repayable by terminable annuities. The first attempt to deal with the problem of congestion came with the land act of 1891 which established the Congested Districts Board to deal with the peculiarly bad conditions of the West. The definition of a congested district given in that Act (Section 36) was as follows:

> Where at the commencement of this Act more than twenty percent of the population of a county, or in the case of the County Cork of either riding thereof, live in electoral divisions of which the total rateable value, when divided by the number of the population, gives a sum of less than one pound ten shillings for each individual, those divisions shall for the purposes of this Act be separated from the County in which they are geographically situated, and form a separate county (in this Act referred to as a congested district county) . . . .

Under this definition, the powers of the Board were limited to certain districts in the western counties, but later (under the land act of 1909) these congested districts were extended to include the entire counties of Donegal, Sligo, Leitrim, Roscommon, Mayo, Galway and Kerry, with six rural districts in County Clare and four rural districts in County Cork. The problem was, however, not so much of locality as of the condition of the people, and the term "congested area" is now popularly used with reference to any district where a considerable number of holdings are of such size or quality as not to afford a reasonable means of livelihood for their occupiers, the term "relief of congestion" being applied to the provision of land for the benefit of persons so situated.

The powers originally given to the Congested Districts Board included assistance for migration and emigration; sale of suitable seed potatoes and seed oats to occupiers; aid for the development of agriculture, forestry, livestock and poultry breeding, spinning and other suitable industries, and especially fishing, including the construction of

piers and ports, and the supply of fishing boats and gear. Some limited powers were also given for the enlargement of holdings, and these powers were amplified by subsequent legislation by which the Board was enabled to obtain advances from the Land Commission (which had been set up under the land act of 1881 to carry the provisions of that act into effect) for the purchase of entire estates for resale to the tenants after any necessary improvement and rearrangement of holdings. The original income placed at the disposal of the Board (£41,250 per annum) was hardly adequate for its powers of relief, and hence in its earlier stages its activities were much circumscribed. Nevertheless, it performed useful experimental work and prepared the ground for the more extended operations assigned to it by the land act of 1903. This act was passed in an effort to end agrarian unrest, which had developed as a result of the slowing down of land purchase under the earlier acts. After the South African War, the price of land stock, by means of which, since the 1891 act, purchases were financed, had declined in common with other government securities, and landlords consequently became unwilling to sell their lands to the tenants. There was a demand not merely for an extension of land purchase, but for the acquisition of the large grazing farms (termed "ranches") for division among uneconomic holders in the neighborhood or among landless men. To meet that demand, the act of 1903 set up within the Land Commission a new body ("Estates Commissioners") with powers to relieve congestion by the purchase of entire estates from the owners for the purpose of improving, enlarging, and rearranging the holdings before vesting them in the tenant purchasers. In the acquisition of estates, the Commissioners were enabled to purchase untenanted land situate thereon and suitable for division, the expression "untenanted land" meaning land held by the owner and not let by him on any contract of tenancy other than temporary lettings of under one year's duration. Similar powers were given to the already established Congested Districts Board, and the Board's income was increased to £86,250 per annum.

In general, the Commissioners were required to recover the full purchase price of an estate, but they were empowered to resell at a loss not exceeding 10 percent of the purchase money where an estate qualified for treatment as a congested estate, i.e., "an estate not less than half the area of which consists of holdings not exceeding five[1] pounds in ratable value, or of mountain or bog land, or not less than a quarter of the area of which is

[1]Raised to seven by the act of 1909.

held in rundale or intermixed plots." On the improvement of estates, the Commissioners could expend money either by way of free grants or by way of advances to be repaid by additions to the annuity to be paid by the purchaser. The money for such improvements was provided at first out of a reserve fund placed at the disposal of the Commissioners and later, when the fund was exhausted, by means of sums voted annually by Parliament.

In the purchase of estates under the 1903 act the Board as a rule dealt with the poorer and more involved estates in the area within its jurisdiction, where frequently a number of the holdings were held in "rundale"—that is, in small scattered plots without proper communication with each other. A complicated process of "striping" these plots was necessary in order to rearrange the holdings into self-contained units, prior to resale to the tenants. Since the Estates Commissioners dealt with estates in the congested districts (as well as in other parts of the country) which the Board was not in a position to purchase, the actual operations of the two bodies, though similar, did not overlap.

The act of 1903 was financed out of a specially created Irish Land Purchase Fund. The purchase money of estates was paid in cash raised by the issue and sale of 2.75 percent stock. Any losses due to depreciation in the price of this stock, and the consequent issue of excess stock to provide the cash payable to the landlord, were to be made good, first from a fund known as the Ireland Development Grant, and then from certain grants from the Exchequer in aid of Irish local taxation. The holdings, with enlargements if any, were vested in the tenant purchasers subject to the payment of land purchase annuities at the rate of 3.25 percent per annum, of which 2.75 percent was for interest and 0.5 percent for sinking fund. The accumulation of this sinking fund half-yearly at 2.75 percent would amortize the annuity in a period of sixty-eight and a half years.

The legislation so far enacted contained no provisions enabling the Commissioners or the Board to acquire estates compulsorily. A few years' experience of the working of the land act of 1903 showed that the voluntary system of land purchase was not solving the problem of congestion, and a commission under the chairmanship of Lord Dudley was appointed in 1906 to examine the question in all its bearings. In 1908 it presented a lengthy and detailed report which gives a valuable account of the agricultural conditions then obtaining in Ireland. The recommendations of the Commission were embodied in the land act of 1909, under which the powers, duties, and income of the Congested

Districts Board were further enlarged and its constitution was remodeled. The Board's annual income was increased to £250,000, and both the Board and the Estates Commissioners were given certain compulsory powers of acquisition, but only in relation to congested estates.

The land act of 1909, however, had as its main purpose the amendment of the financial provisions of the 1903 act. Owing to the low market price of the 2.75 percent stock, which was the basis of the advances made for land purchase (averaging around £88 per £100 of stock), the British Treasury had to issue £113 of stock for every £100 paid in cash to the landlord. The charge for excess stock thus became a very serious matter and, as the Ireland Development Grant was quite inadequate to meet it, the bulk fell upon the Irish ratepayers. The act of 1909 remedied this situation by providing that future sales were not to be financed in cash, save in compulsory acquisition cases if required by the owners, but in a new 3 percent stock to be issued to the vendors of estates at its face value. The annuity rate, payable by the purchasing tenants, was raised to 3.5 percent (3 percent for interest and 0.5 percent for sinking fund).

The change from payments in cash to payments in stock, which tended to depreciate in market value, again slowed down land purchase; the landlords became unwilling to sell, and the tenants who desired to purchase were faced with proposals for higher annuities. With the failure of the voluntary system to complete land purchase, an extension of compulsory powers came to be widely advocated. A convention (known as the Irish Convention) was held in Dublin in 1918, and an agreed bill was drafted on the lines of its recommendations and introduced in the British Parliament as the land bill of 1920. The political conditions in Ireland, which eventuated in the division of the country into "North" and "South" and the establishment of separate governments, put a stop to further British legislation for Ireland as a whole. It was left to the new Government of the (then) Irish Free State to solve its own land problems in its own way.

The dual task of completing the purchase of all unpurchased holdings and of relieving as far as possible the very large amount of congestion still remaining to be remedied was undertaken by the enactment of two important measures—the land law (Commission) act of 1923 and the land act of 1923. Under the former, the Land Commission was reconstituted (the new Commissioners appointed under the act retaining the powers and duties of the former Estates Commissioners under the land acts of 1903 and 1909), and the Congested Districts

Board was dissolved, its land settlement functions (and funds), with the appropriate staffs, being transferred to the Land Commission. It was considered that the whole question of land settlement could be handled better by a single body.

The land act of 1923 was a bold and comprehensive measure. It provided that, with certain exceptions such as residential demesnes and holdings suitable for building purposes, all the remaining tenanted agricultural lands in the Free State should, on appointed days to be declared, vest in the Land Commission for transfer to the tenants as purchasers—with power to the Land Commission to retain certain holdings in whole or in part for the purpose of improvement or enlargement or for utilization for the relief of congestion. For this last mentioned purpose, further very wide powers were given to the Land Commission. The act provided that, with certain exceptions, all untenanted land situated in congested district counties, and such untenanted land situated outside such counties as was declared to be required for the relief of congestion, could be acquired compulsorily by the Land Commission; and to supplement these compulsory powers, untenanted land outside the congested district counties might be bought by the Land Commission by voluntary agreement with the owners. The purposes for which acquired land might be utilized by the Land Commission were defined in the act; these included the enlargement of uneconomic holdings in the vicinity and the provision of new holdings for migrants from other districts whose lands were to be used to relieve local congestion. The purchase money of untenanted land acquired by the Land Commission under the 1923 act was advanced in 4.5 percent land bonds, and annuities were fixed on the parcels of land allotted, so as to provide for the repayment of the advances in the same way as tenanted land advances, by means of annuities at 4.75 percent, of which 4.5 percent represented interest and 0.25 percent sinking fund, to run for a period of sixty-six and a half years. (A later amending act of 1927 gave power to resell at a loss in certain cases where special circumstances required.)

Provision is made in the annual parliamentary vote for the Land Commission for moneys required for the improvement of holdings rearranged prior to resale or of newly created holdings (involving, where necessary, their equipment with roads of approach, fences, drains, dwelling houses and outoffices, supply of peat fuel, etc.). So much of the expenditure on such improvements as the Land Commission considers can be repaid by the purchasers is made repayable by them, along with their purchase annuities.

In the light of experience of the working of the land act of 1923, various amending acts were found necessary to enlarge the powers of the Land Commission in various respects and to alter procedure so as to ensure more expedition. Most of this amending legislation had for its purpose the improvement of the machinery of vesting holdings in the tenants, but the land act of 1931 also provided the Land Commission with wider powers for the rearrangement of holdings and migration. Then followed the land act of 1933, which extended still further the Commission's powers for the purchase of land required for the relief of congestion or for division among the classes of persons authorized to receive new holdings, and, in fact, removed most of the restrictions which had hitherto applied to their operations under this head. The years following the enactment of this act saw a speeding up of the work of land division, which continued to be carried on extensively until the conditions of the war years from 1939 onwards enforced a curtailment of operations.

In deciding what land to acquire, regard is had to the manner in which the land is worked and to the number of workers employed. Farms which are properly worked to their full capacity and give sufficient employment are not interfered with. The land act of 1933 amended the constitution of the Land Commission and defined the respective powers and functions of the Minister for Lands and the Commissioners. While emphasizing that the Minister is to have full control over the work and administration of the Commissioners (other than the Judicial Commissioner, who is a judge of the High Court and discharges most important legal functions under the land acts), it definitely assigns to the Commissioners exclusive jurisdiction over certain "excepted matters" connected with the determination of lands to be acquired, the prices to be paid, and the persons to whom they will be allotted. The object is to remove the actual details of land settlement from the influence of party politics. In making their decisions, the Land Commissioners have before them the reports of their local inspectors. An appeal tribunal was set up under the act on which two Lay Commissioners nominated by the Government are associated with the Judicial Commissioner for the hearing of appeals by persons aggrieved by orders of the Land Commissioners. Land is not taken compulsorily from any person for division without full opportunity being given him to have objections duly heard and to have a price fixed which has due regard to the fair value of the land to the Land Commission and to the owner respectively, and which must in certain cases be the full market value.

In envisaging the extension of land settlement under the wide provisions of the act of 1933, the State had to take account of the enhanced price of government securities current on the stock market and the corresponding reduction in interest yield. The Land Bond Act of 1934, a corollary of the land act of 1933, provided that the purchase money of all land acquired by the Land Commission (other than purchase money in respect of previous commitments) should be advanced in land bonds bearing interest at a rate which might vary from 3 to 4 percent per annum, as the Minister for Finance might prescribe for each particular series. The rate prescribed for the current (1948) series is 3 percent. The annuity rate remains at 4.75 percent, but the sinking fund is correspondingly increased, with the result that the period of repayment of advances made subsequent to the passing of the Land Bond Act of 1934 is shorter than for advances made before that act came into force.

Further land acts were enacted in 1936, 1939, and 1946, mainly for the purpose of amending and interpreting the previous land acts—particularly the land act of 1933—in points where the intentions of the legislature had been doubtfully expressed or where further specific powers were required for the work of the Land Commission. These acts also simplified procedure in certain points of legal and accountancy work of the Land Commission. The powers of the Land Commission to acquire land compulsorily were extended to permit of the acquisition of holdings already vested in purchasers under the prior land acts, where the condition and use of the land rendered this advisable—subject, however, to the condition that no declaration of intention to acquire lands which were vested in purchasers under the land act should be made for a period of seven years from the date of vesting.

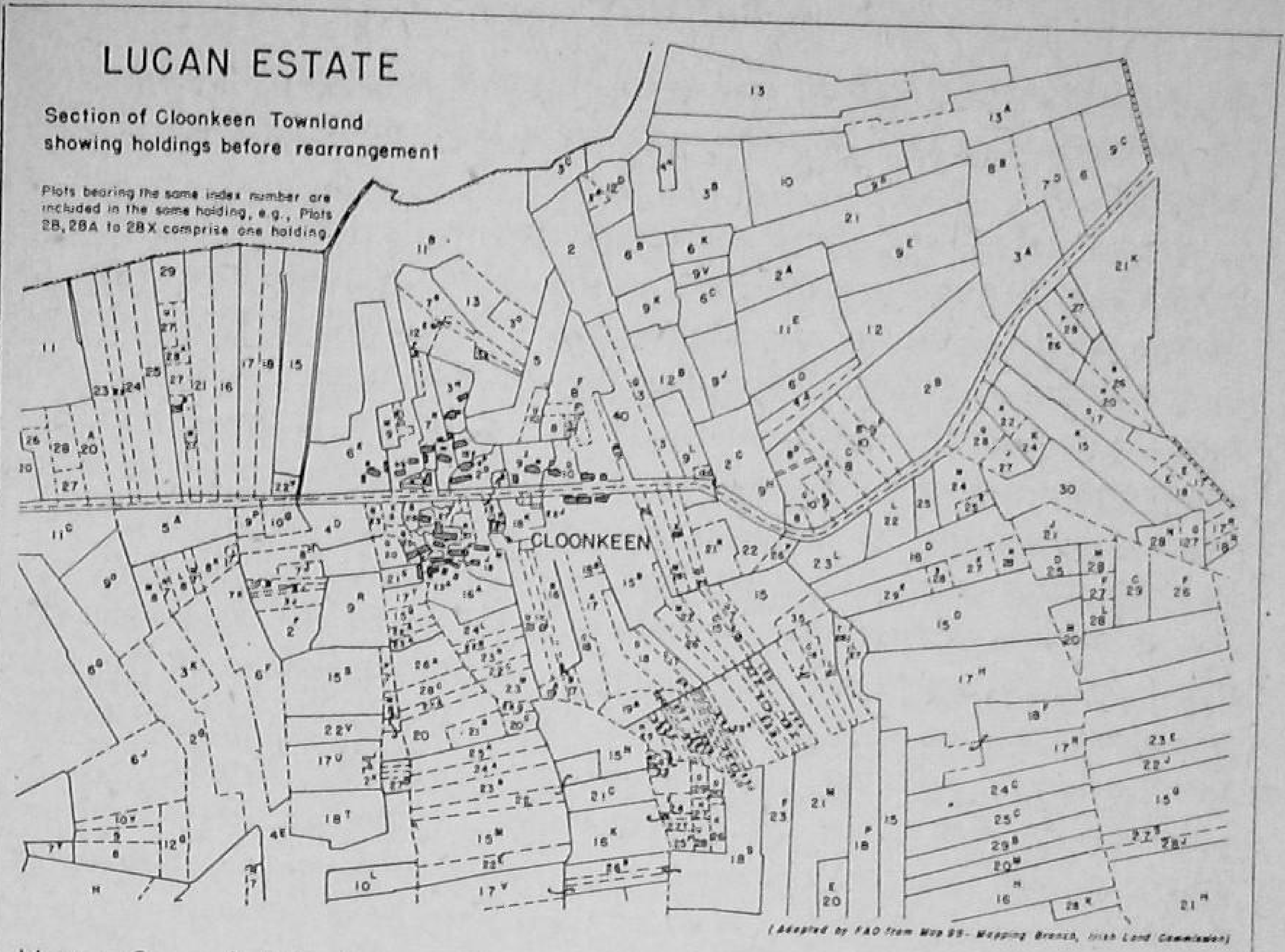
The results achieved under the various land acts have been remarkable. Prior to 1923, a total of 1,005,000 acres had been acquired for division by the Congested Districts Board and the Estates Commissioners. In the period from 1923 to 31 March 1947 (the latest date for which statistics have been published), the Land Commission, under the land acts of 1923-46, acquired a further area of 1,010,000 acres at an average price of £10 per acre and on 31 March 1947, they had in process of acquisition an additional area of 38,000 acres, while extensive further areas were under inquiry with a view to possible acquisition. Of the 1,010,000 acres acquired, over 924,000 acres had already been divided (among some 60,000 approved allottees); of this area, about half was utilized for the enlargement of some 37,500 uneconomic hold-

ings and the other half for the creation of some 22,500 holdings or plots given to ex-employees on the acquired lands, former evicted tenants, migrants, cottiers, and other persons or bodies of trustees.

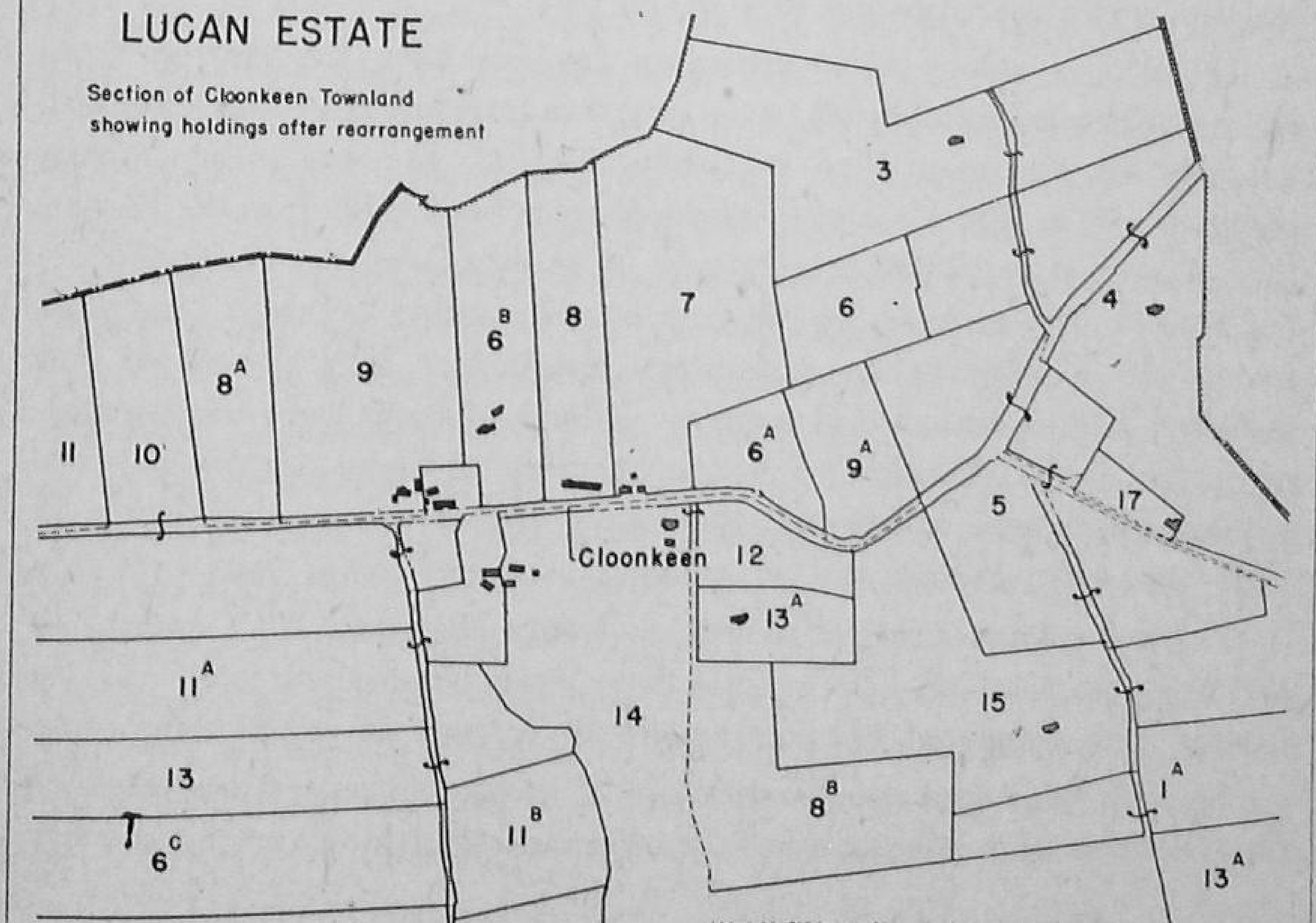
Apart from the operation of the land acts of 1923-46, one of the most difficult problems still confronting the Land Commission is the resale of the remaining portions of the former Congested Districts Board estates. All the holdings on these estates which could be readily dealt with have been revested in the tenant purchasers, but there remain nearly 14,000 holdings which present great difficulties before vesting can take place. Many, if not most, of these holdings require improvement, enlargement, and rearrangement. There is now very little untenanted land left for division in the congested districts, and the Land Commission is concentrating on the migration of some of the tenants to holdings elsewhere and the use of the vacated lands for the relief of local congestion. Migration, however, is not easy to carry out, especially to another county, as it is often hard to persuade tenants to move to a strange district and to satisfy them with holdings in exchange for their own.

The rearrangement of holdings is also an intricate and tedious process, for the tenants are often very exacting, and much tact and discretion as well as technical skill are required by the Land Commission inspectors engaged on this work. The holdings concerned consist for the most part of small scattered patches of land, sometimes as many as twenty or thirty of these being included in one holding, while the lands are often unfenced. Where possible, the rearranged holdings are brought up to an economic standard; but even where this is not possible, the rearranged and enlarged holdings are much more valuable than the old ones and greatly improve the living conditions of the tenants. Some idea of the complexity of this rearrangement work will be gleaned from the accompanying maps, which show the rearrangement and improvement of holdings carried out on a portion of a County Mayo estate. Maps 9 and 10 show the holdings before and after rearrangement. The inducements held out to the tenants to agree to the exchanges are the enlargement of the holdings by additional land (either from migrants' surrendered holdings or from adjoining untenanted lands), better housing and other improvement works on the holdings.

In an effort to convert some of the extensive mountain and waste land in the congested districts into arable land for division into new holdings, the Land Commission has carried out experiments in reclamation by drainage, fencing, and chemical treatment of the soil. The



Maps 9 and 10. Lucan Estate, Cloonkeen, Ireland. Map 9 (above) shows the extent of subdivision in the town of Cloonkeen, Ireland, before consolidation, and Map 10 (below) the same area after consolidation. Note in particular the dispersion of the farmhouses in Map 10 and the improvement in access given by the construction of the few new service lanes.



Department of Agriculture also gives financial assistance to proprietors of holdings to reclaim by their own work the poorer portions of their lands.

In coastal areas, schemes of sand-fixation by the sowing of bent grass have also been carried out by the Land Commission in order to restore sandy areas to agricultural use. The heavy expense involved in the creation of new holdings by the reclamation of waste land militates against a wide extension of this work and it is recognized that substantial economic improvement of conditions in the congested areas depends primarily on the migration of landholders from these areas to holdings to be provided for them on untenanted lands elsewhere and the utilization of migrants' surrendered holdings by the remaining tenants. Migration was for that reason a prominent feature of the land settlement policies of the Congested Districts Board and the Estates Commissioners, and has been equally prominent in the policy of the Land Commission since 1923. Thousands of families have been induced to leave their old homes in overcrowded areas and to start afresh in newly created holdings. Most of them have gone to lands not very far removed from the areas of congestion although large numbers, particularly of the better off and more enterprising families, have been moved to the midland and eastern counties.

To supplement this migration of individual families, the Land Commission has in recent years been experimenting with schemes of specially assisted migration from the west to the east.

In 1935, a colony of twenty-seven families from the poorest parts of the Irish-speaking districts in the west was transferred to fully equipped holdings of very good land in County Meath. For generations, many of the people in these desolate western districts have existed on the borderline of starvation, depending largely in recent times on doles and relief works. These were the weakest of all possible migrants, and they had to be assisted to an exceptional extent, not only in money and material, but in agricultural training. Many of them were unaccustomed to the use of the plow or to the handling of horses or stock. Notwithstanding these handicaps, they have settled down successfully in their new surroundings and are making excellent use of their holdings.

Further colonies were installed in County Meath in 1937 and 1939, and in all a total of 122 families have been transferred from various parts of the congested districts under this scheme of colony migration.

Since 1939, a policy of migration in smaller groups (three or four families from the same district) has been adopted in place of the more

expensive and unwieldy colony migrations, and already 212 migrant families have been provided for under this group scheme. Thus, under the combined "colony" and "group" migration schemes, 334 families have been transferred to holdings of fertile land in the eastern and midland counties, giving up 7,361 acres in exchange for 9,020 acres. The cost of the land used for the new holdings under the group scheme (including allowances paid to the migrants for "occupation interest" in their old holdings) has amounted on the average to £454 per holding. The average cost of buildings has been £413 per holding, making the total average cost per holding £867, exclusive of expenditure on the general development of the lands by the making of roads, fences, drains, etc.

Over and above the cost of the land and its equipment, on division with buildings, etc., there is additional expenditure incurred on "special assistance" for stock, implements, fuel, preliminary tillage, transfer expenses, and wages for migrants' work on internal improvements. The total cost of this special assistance to date, under the combined colony and group migrations, is approximately £63,500. The average cost of the special assistance provided under the group scheme has so far amounted to approximately £130 per holding, which is much less than the corresponding costs in the case of the earlier colony migrations.

The purchase annuity charged on the holding is based on the cost of the land, but is "revised" in accordance with a provision of the land act of 1933, which granted a general reduction of 50 percent (in some special cases 55 percent) in land purchase annuities payable at the date of the act, or set up after that date. The migrants, in common with other allottees, have therefore to pay revised annuities which recover only half the cost of the land, the State accepting liability for the other half. The migrants are also liable for additional annuities set up to recover such proportion of the building expenditure as the Land Commission considers can reasonably be recovered on the security of the holding. The average amount of building costs recovered in this way is £67 per holding, the net average cost of buildings thus amounting to £346 per holding. None of the expenditure on general development (roads, fences, etc.), or on special assistance, is recoverable from the migrants.

The group scheme has so far been operated very successfully and with every prospect of further development. Apart from the problem of finding sufficient suitable land in the reception areas, perhaps the chief obstacle to removing a sufficient number of tenants out of the

overcrowded districts is the reluctance of the people, particularly the womenfolk, to leave the old homestead and settle down far afield in places where environment and farming conditions are known to be very different. This reluctance is overcome in the group scheme in which, with several families from the same village sharing in the venture, some of the old contacts are preserved. At the same time each group is, from the administrative viewpoint, kept within manageable proportions.

While experimenting with these schemes of colony and group migration, the Land Commission has continued the older practice, operated all along, of effecting individual migrations which involve no special assistance from the State in the provision of stock, implements, etc., and by means of which, as already stated, several thousand families have been moved out of congested areas. The work has, of course, suffered a serious setback during the years of the emergency. Before the war, following a special examination by an interdepartmental committee set up by the Government in 1937 to inquire into the economic conditions in the congested areas, an extensive program of land settlement was decided on, involving the provision of 6,000 holdings for migrants from these areas on lands to be acquired in other parts of the country, as well as 2,000 holdings on lands to be acquired in the congested districts themselves.

Progress on this program was effectively halted during the war years, when staff had to be diverted to emergency services in other departments of the State and when, even if staff had been available, the equipment of new holdings with houses, etc., would have been impossible by reason of the shortage of building materials. A resumption of land acquisition has, however, recently been found possible and, with the supplies position now somewhat improved, it is hoped that the Land Commission will be able to proceed without further interruption with the work of land settlement.

4. Consolidation of Land in Switzerland[1]

THE MANY FACTORS, natural and human, which have gvien rise to the fragmentation of farm holdings in Switzerland are similar to those which have produced the same condition in the rest of Western and Central Europe, but their effects there are even more striking. The varied configuration of the country and the fact that even very lofty regions are often populated explain the extent of the phenomenon. The influence of land relief and climate on the distribution of cultivable lands and on the tenure system has not yet been the subject of careful inquiry, and there would seem to be room for an examination of the relations existing between the land system on the one hand and the nature of the subsoil (which can vary considerably within short distances), the quality of the soil, the climate, the manner of settlement of the population, and the organization of the resulting enterprises on the other. The great differences observed between Switzerland and the adjoining countries also derive partly from the fact that the development of Swiss agriculture has not been directly influenced by European wars. These differences include the very high prices of land and the very large amounts of capital invested in estates, which make improvements in the land system difficult. The area of cultivable lands—which can, for all practical purposes, be no further increased—has long been insufficient, and the great pressure of industrialization and the steady growth of urban areas and of lines of communication continually reduce the agricultural area. Since 1905 some 33,000 farm properties have disappeared, and today agriculture is losing annually some three or four thousand hectares of its best lands.

The number and size of agricultural enterprises indicate the extent to which use is made of the available land. Table 1 shows the distribution of the 238,481 holdings enumerated in the 1939 census of farms.

Properties which are in a single block are found principally in regions of isolated farmsteads, that is, in central Switzerland. Fragmentation increases with the importance of the village in rural life, and is therefore most marked in the most anciently occupied regions of the Plateau, which are characterized by arable cultivation, and in the Al-

[1]Translation of French original.

TABLE 1.—SWITZERLAND: DITRSIBUTION OF AGRICULTURAL HOLDINGS BY SIZE

Size	Number of farms	Percentage of total number	Percentage of total cultivable area
0– 1 ha.	47,893	20.1	1.7
1– 5 ha.	89,466	37.5	18.1
5–10 ha.	59,044	24.7	31.3
10–15 ha.	23,911	10.0	20.8
15–20 ha.	9,440	4.0	11.3
Over 20 ha.	28,727	3.7	16.8
TOTAL	238,481	100	100

pine valleys. At the time of the 1939 census, 2,281,272 plots were registered, excluding woodland plots forming part of farms, which gives, for the country as a whole, a rough average of ten plots per holding. Table 2 illustrates this position.

It is clear from this table that at least 46 percent of Swiss farms are in need of consolidation. The figures given are, however, approximate, as, in the absence of exact maps of the highly fragmented regions of southern Switzerland at the time of the census, it was often necessary to be content with estimates, and it is only recently that aerial surveys have given an exact picture of the situation in some communes of the Ticino. In two communes in Val Blenio about 88,000 plots distributed among 656 owners have now been enumerated on an area of 2,200 hectares, which represents an average of 134 plots per owner, with an average

TABLE 2.—SWITZERLAND: DISTRIBUTION OF FARMS BY NUMBER OF PLOTS PER HOLDING[1]

Number of plots in holding	Number of holdings	Percentage]
1	41,608	17.7
2	29,912	12.8
3– 5	55,400	23.6
6–10	44,498	19.0
11–15	23,568	10.0
16–20	13,771	5.9
21–25	8,115	3.5
26–50	12,903	5.5
51–100	3,516	1.5
Over 100	1,234	0.5
TOTAL NUMBER OF FARMS POSSESSING LAND OF THEIR OWN	234,525	100

[1]Excluding woodland plots.

area of 250 square meters. Similar situations are found in the cantons of Grisons and Valais. (See Table A, appended.) Maps 11 and 12 illustrate the situation in these badly fragmented areas.

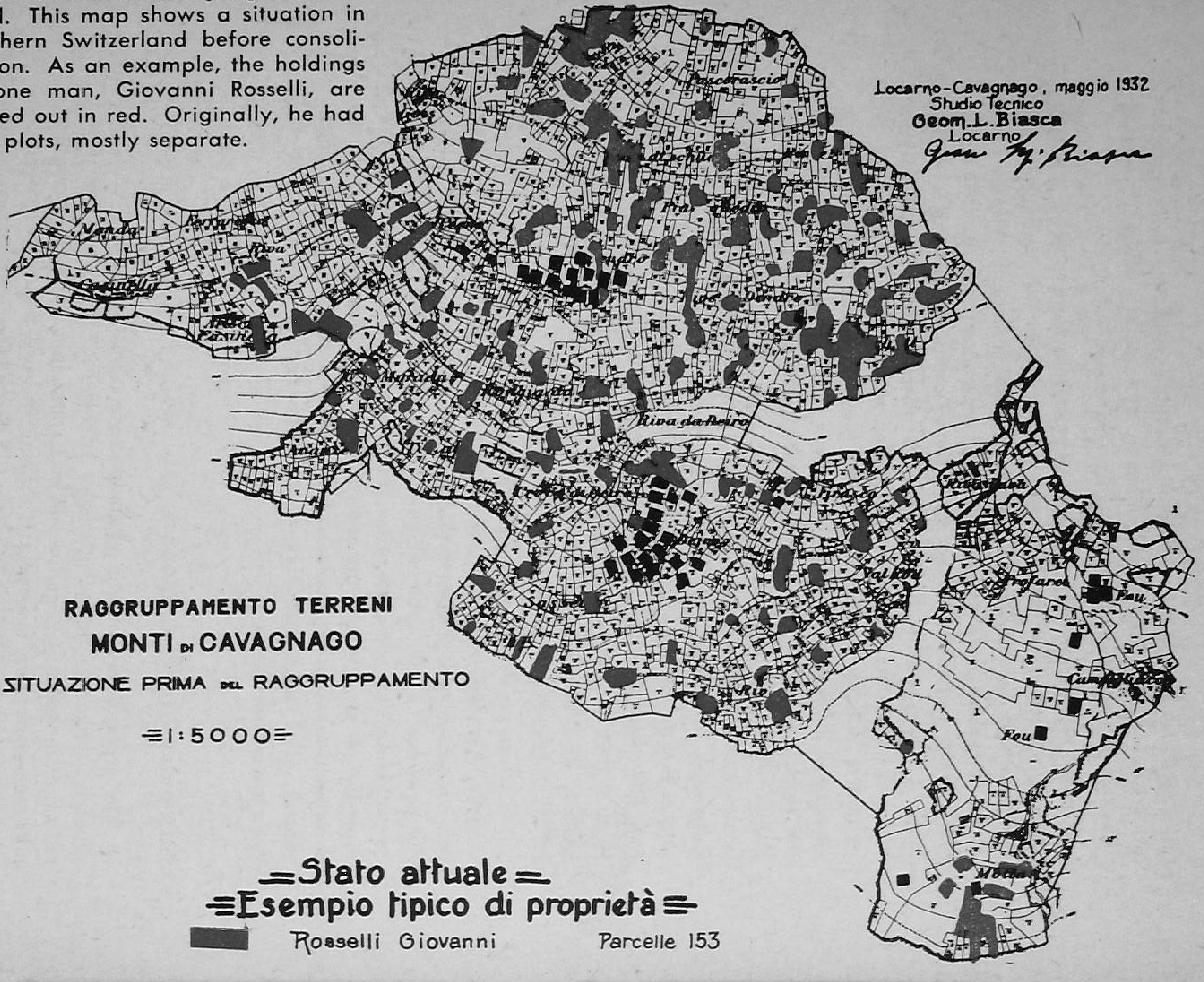
It will not always be possible to reduce these plots to small numbers, since they may be situated on steep slopes where the configuration of the land and the existence of improvements (retention and revetment walls, irrigation installations, primitive agricultural works, etc.) make subdivision inevitable. Even if, while effecting improvements to the land, it were possible to provide such places with roads suitable for wheeled traffic, the nature of the ground would not always permit the reduction of each farm to one or two plots. In fact, however, the resources of the mountain people would not suffice for the provision of all the roads necessary, and it is therefore precisely in the mountain communes where holdings are in greatest need of consolidation that expenses must be reduced to a minimum. It has been ascertained in many communes that, once consolidation has been achieved, the people have sought further to round off their estates by the purchase of adjoining plots and that these holdings are not further subdivided except at the time of inheritance. It is also desirable to point out that the laws of most cantons fix minimum areas varying from 18 to 40 ares, below which a property may not be subdivided.

Another peculiarity arises from the federal structure of Switzerland and the high degree of autonomy of the cantons. Nearly all matters connected with the development of agriculture fall primarily within the province of the cantonal authorities, which have had full liberty in providing their own incentives to improvement. On account of this diversity of procedure, large enterprises of land improvement, such as consolidation of plots combined with schemes of drainage and water control, often necessitate long deliberations between the authorities of the cantons interested.

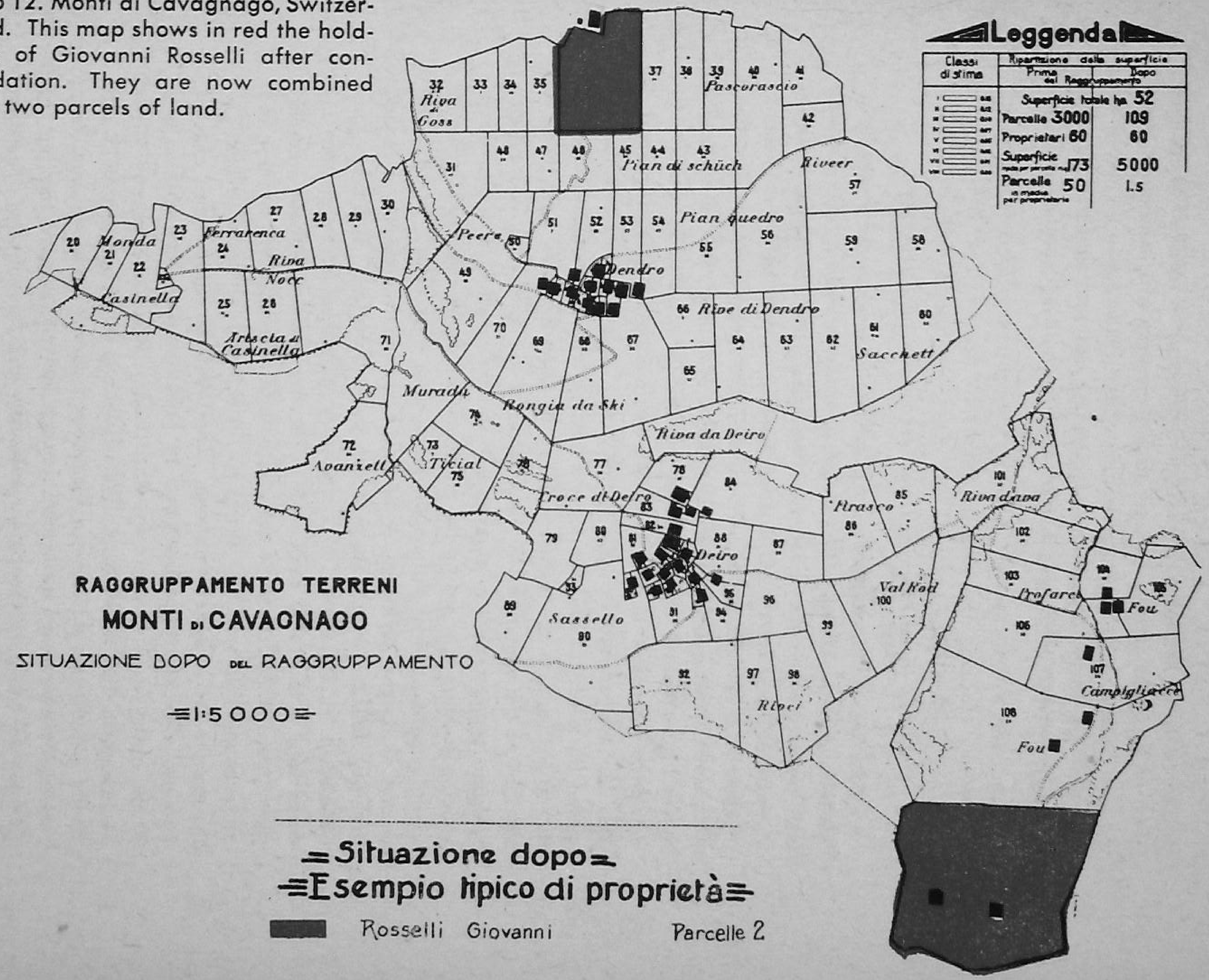
Summary of Work Done

The evolution of current legislation well reflects the diversity of the country. Although the inconvenience arising both from the progressive reduction in size of agricultural holdings and from their fragmentation into numerous plots, isolated and difficult to work, has been recognized from the days of the feudal estates and the division of the population into classes, this tendency could not be stopped. On the contrary, the

Map 11. Monti di Cavagnago, Switzerland. This map shows a situation in southern Switzerland before consolidation. As an example, the holdings of one man, Giovanni Rosselli, are picked out in red. Originally, he had 153 plots, mostly separate.



Map 12. Monti di Cavagnago, Switzerland. This map shows in red the holdings of Giovanni Rosselli after consolidation. They are now combined into two parcels of land.



fragmentation of agricultural holdings increased as a result of the acquisition of the right of free disposal of real property which followed from the distribution of the communal lands of the Plateau and the abolition of traditional tenure conditions (*servitudes*), so that at length in the nineteenth century effective subdivision of the land had become general.

From the end of the last century, the more enlightened section of the people, realizing the danger, sought to improve the situation by understandings with the cantonal authorities, who alone until about 1880 were considered to be concerned with legislation on this subject.

Under the influence of similar tendencies in southern Germany, a few cantons promulgated, before the creation of the Federal State (1848), laws relating to the consolidation of holdings. It is no longer possible to estimate the effect of the first of these laws, enacted by the canton of Lucerne in 1808-09 and revised in 1837, but in any case no important work was carried out. In 1846 Schaffhausen enacted a law on cadastral survey which placed an obligation on owners of land to participate in schemes directed to a satisfactory regrouping of landed property. This law was revised in 1857 to the extent that any action taken required the assent of half the owners holding half the lands included in the project, and in this form continued in force till 1941. In 1866, at the time of the operations for the control of the Rhine, St. Gall authorized the supplementation of measures for the control of watercourses and for drainage schemes by the regrouping of fragmented holdings and prescribed the methods to be followed in such operations. In 1875 the canton of Aargau prescribed conditions for the improvement of landed property, founded on the laws of the state of Baden. The rules thus established in the matter of compulsory participation were later incorporated in the Swiss Civil Code. The Argovian regulations were replaced, in 1942, at the same time as those of other cantons, by new and more comprehensive legal provisions, which were however related to the exceptional wartime conditions. The following cantons also enacted laws on compulsory participation in land improvement works prior to the introduction of the Swiss Civil Code: Bâle-Campagne, in 1895; Neuchatel, in 1899; Ticino, in 1902; Fribourg and Vaud, in 1907; and finally Zurich, in 1911. For a long time, however, these cantonal laws remained substantially ineffective, through lack of financial backing for the powers taken by the public authority and through the opposition of vested interests.

Encouragement of Consolidation by the Confederation

From time to time the Confederation took measures to fill the gaps which have just been mentioned. Its first legislative action in the matter was the federal decree of 1884, replaced on 22 December 1893 by the *federal law concerning the improvement of agriculture by the Confederation* and the executive orders related thereto, which are still in force. This law authorizes the Confederation to grant financial assistance to facilitate the application of measures tending to stimulate agriculture. It prescribes, among other things, that *the Confederation may make grants to schemes intended to improve the soil or to facilitate its exploitation.* Such grants may amount to as much as 40 percent, or indeed in exceptional cases to 50 percent, of the expenditure incurred, and are always proportionate to cantonal contributions. By this means the financing of enterprises was rendered much easier. The federal government, however, left to the cantonal authorities the duty of regulating all technical, legal, and administrative questions relating to the organization, execution, and maintenance of actual works, and made them a grant for the remuneration of rural engineers in possession of the diploma of the Federal Institute of Technology. As a general rule, communal, cantonal, and federal grants represent a total of 60 to 70 percent of the expenses connected with consolidation. The cantons of the mountainous regions, whose financial position is precarious, receive larger contributions; in the canton of Ticino, for example, the figure sometimes amounts to 90 percent. The stimulation given to land improvement by the law on the improvement of agriculture soon disclosed the difficulties which such schemes encounter in the absence of power to compel the adherence of recalcitrant owners.

The Swiss Civil Code, which came into force in 1912, made it possible to remedy this state of affairs. It dealt with the fundamental questions relating to land improvement, and included, moreover, various provisions restricting the right of ownership and governing both the setting up of "syndicates" and the execution of enterprises of public interest.

In this regard Article 703 is of fundamental importance. Its provisions are as follows:

> When improvements to the soil (control of watercourses, drainage schemes, reforestation, roads, consolidation of fragmented forests and of rural lands, etc.) cannot be carried out except by the owners as a body, and when measures necessary to this end have been decided upon by two-thirds of the persons interested

who possess more than one half of the land concerned, the other owners shall be compelled to adhere to this decision.

The procedure shall be regulated by cantonal law.

Cantonal legislation may relax the conditions which this code attaches to the execution of such measures and may, by analogy, apply the same rules to building land.

The land improvement syndicates established on this basis are public bodies and are subject to cantonal regulations and also to the general supervision of the administrative authorities.

Only the cantons of Uri, Schwyz, Nidwald, Glaris, and the two Appenzells (which are, except Glaris, the cantons in which fragmentation is least advanced), have not yet made adjustments in the federal legislation to facilitate the execution of land improvement schemes and of consolidation of holdings. In all the other cantons, the voluntary adherence of only half the interested owners is necessary before all can be compelled to participate. The precise terms of the regulations vary somewhat from region to region, but usually the owners accepting the scheme must also own at least half the area concerned. Some cantonal governments have taken powers to order improvements in specified cases without previous consultation with the owners. The Zurich legislation provides for a kind of veto, a proposed improvement being considered as rejected only if a majority of the owners possessing also more than one half of the land declare themselves *opposed* to the project. Moreover, some of the less elaborate laws, taking into account the frequently passive attitude of the population, count those who express no opinion as supporting the scheme.

In 1918, the Federal Council passed a decree directed especially to the encouragement of consolidation schemes. In the terms of this decree, in badly fragmented areas the cadastral survey prescribed by the Swiss Civil Code can be carried out only when rearrangement of plots has been completed. This procedure is very economical for the Confederation, which in one way and another bears 70 percent of the cost of these surveys. The savings thus effected in the surveys are applied to a supplementary federal contribution to the cost of consolidation, which represents from 5 to 15 percent of the costs of the enterprise, according to the amount of regrouping necessary.

During the war of 1939-45, the Federal Council, in the course of measures designed to increase the country's food supplies, passed special

decrees to facilitate and expedite the execution of land improvements. These decrees authorized the Department of Public Economy to make improvements to land in order to increase the production of food. These powers could be conferred on cantonal authorities at their request, but in fact the provisions have been applied only in exceptional cases.

Two other provisions of the decrees of the Federal Council of 11 February 1941 and 20 March 1942 proved much more effective than the compulsion envisaged above. They provided for the fixation of the rate of federal grants at 50 percent for consolidation and at 30 to 40 percent for drainage works carried out alone and gave authority to the cantonal governments to modify by ordinance the cantonal law of land improvement. The cantonal regulations issued on this basis were valid only during the exceptional war period, unless they were duly incorporated in the ordinary law. Other orders aimed at facilitating consolidation were issued; for example, in the canton of Vaud, grants in aid of drainage works in badly fragmented areas were made only on condition that the plots were regrouped. In the same way, the Confederation refuses to subsidize proposals for the construction of roads in regions which remain badly fragmented.

Table B (appended) shows both the development of the work at different times and the rapid increase in expenditure. Schemes dating from before the war of 1914-18 rested for the most part on local regroupings which did not result in any significant decrease in the number of plots. The works carried out with help from the Confederation up to 1912 covered an area of 6,250 hectares, of which not less than 2,000 fell in the single canton of St. Gall and 1,400 in Bâle-Campagne, these two figures thus representing more than half the total.

From 1921 to 1940, consolidation operations cost on the average three million francs yearly, of which sum the Confederation bore about one third. During the whole period between 1885 and 1940, only 667 schemes relating to 80,879 hectares had been carried out, but between 1941 and 1948, 431 consolidation operations affecting a total area of 146,305 hectares were completed or begun. Table B also shows how the projects have increased in importance. At the present time, the average area affected by an operation is 425 hectares, which corresponds to an expenditure of 600,000 francs. The value of the works now in progress in the country as a whole amounts to 152.5 million francs.

Consolidation Procedure

Consolidation, in the strict sense, implies the compulsory and methodically organized exchange of the fragmented fields. The procedure adopted in Switzerland is based on the principle of compensation in kind, with due regard to the value of the property. It is therefore necessary to know the area and the value of the lands to which each owner can lay claim. According to present ideas, however, a simple rearrangement of ownership will not suffice: this must be supplemented, where necessary, by an arrangement of roads which will permit the rational use of the redistributed lands, the construction of outlets for the drainage of surface water, and minor improvements necessary to an equitable redistribution.

The arrangements relating to consolidation operations thus fall in the following categories:

(1) Quasi-judicial aspects of the survey:

  (a) determination of the area and value of the lands to which each interested party has a claim and also the eventual complementary values of perennial crops, etc. (*old distribution*);

  (b) exchange of land and rights in land, and finally of crops;

  (c) delimitation of new holdings (demarcation), followed by survey and preparation of the land register, operations which are not strictly part of consolidation.

(2) Measures relating to the construction of roads and outfall channels and to the execution of minor improvements.

(3) Financial and administrative arrangements for the determination of values and the distribution of expenses.

All these measures are interrelated and are functions of one another, and their application demands a procedure which at first sight seems very complicated. By reason of the variations in cantonal legislation the procedure varies from canton to canton. We therefore confine ourselves to setting out schematically the procedure ordinarily followed:

(1) Preparation.

(2) Determination of the existing distribution.

(3) The planning of the project:

  (a) works of construction;

  (b) rearrangement of holdings.

(4) Execution:
   (a) determination on the ground of the new distribution and assumption of possession;
   (b) works of construction.

(5) Winding up:
   (a) accounts (works of construction and compensation);
   (b) distribution of expenses;
   (c) revision of encumbrances and obligations;
   (d) provision for the maintenance of works.

In most cantons the preparatory steps are taken under the aegis of the cantonal supervisory services. The initiative is usually taken by a sufficient number of persons interested or by the communal authorities. As a rule, the interested parties arrange that the authorities and owners concerned are duly informed on the matter. In all cantons consolidation involves the setting up of statutory bodies (syndicates). The meeting of proprietors is the first of these group agencies, and it designates the members of the others, namely, the committee, the assessment commission, the comptrollers of accounts, and, if necessary, the commission for appeals of the first instance. To the extent that they are not already fixed by statute, the rights and obligations of interested parties are laid down in the regulations. The cantonal authority, i.e., the State Council, issues orders for the commencement of operations and at the same time examines the question of grants. When the authorities have approved the map of the area to be dealt with, the regulations, and eventually the project itself, the enterprise acquires legal personality.

The *documents* required for an operation of consolidation consist of a declaration showing that the necessary legal conditions have been fulfilled and of the necessary maps.

The *old distribution* is determined with the help of the cadastral maps. Deficiencies in these are supplied by a ground survey or by the new method of aerial survey, after which maps and registers are prepared.

Since land values vary greatly, exchanges cannot be arranged solely on the basis of areas, and an assessment is therefore made of the exchange value of each plot. This value should correspond roughly with the value of the return obtained and is dependent not only on the quality and situation of the land, but also on the distance of the plot from the center of the farm. The specific value of perennial crops, structures, installations, etc., is estimated separately, as these things can seldom be directly exchanged. A *public inquiry* is then held into these matters

to enable the owners to express their views. (This public inquiry will be referred to again later.)

As a rule, *the preparation of plans* for construction works is entrusted to private agencies working under the supervision of the authorities. In such cases the technical expert prepares a preliminary scheme based on the general idea of the work, e.g., the road system, watercourses, or other works. When the authorities have approved this, and if the results of the public inquiry are satisfactory, detailed plans are prepared.

The reorganization of ownership is generally the subject of a preliminary plan, which lays down the general lines of regrouping, based on the position and the new organization of the farms, and includes also approximate data as to the area and value of the new plots. Definite allotments are made when the authorities have made their decision and the public inquiry has been held.

The *final distribution* is also submitted for the approval of the authorities and made the subject of an inquiry when private interests are at stake.

The *public inquiry*, already mentioned in several connections, is characteristic of the Swiss procedure. It is repeated at each important stage of the enterprise in such a way that each inquiry is based on the results of the previous one. At each stage, representations can be made in writing, within a limited period, to agencies specially set up to deal with them. It is important that the completion of the work should not be held up by the often arbitrary claims of a few owners, and the object of the inquiry is to give owners the opportunity of defending their legitimate interests *at each stage.*

As a matter of principle, the hearing of appeals is not within the province of the ordinary courts, since speedy disposal and a deep knowledge of agricultural questions are required. The duty falls in the first place on bodies designated by the syndicate to decide these cases. Appeals against the decisions of these tribunals are dealt with either by the administrative services of the commune, district, or canton or by an arbitration tribunal consisting of specialists, which may either be designated for each enterprise separately or be nominated by the government for the whole canton. The institution of central appellate commissions has proved particularly successful. As a rule, their decisions on matters of fact are final. What is essential is that the bodies described above should operate in accordance with consistent and equitable rules.

Some Peculiarities of Consolidation in Switzerland

The principal obstacle to the rapid undertaking of consolidation operations is often found to be the high cost of construction of roads, due either to the configuration of the ground or to the lack of suitable material. Simultaneous assumption of possession of the new plots within the whole area demands the completion of such construction within a relatively short time, and expenditure can only therefore be spread over a very limited period. Furthermore, interest on capital advanced by banks cannot be recovered from the grants made. It is therefore essential to reduce, as far as possible, the cost of the new road system by simplifying it, especially by reducing the width of the carriageway and by not consolidating certain secondary roads. Again, it is desirable to employ the farmers on the construction works, which is the easier because, to avoid damage to the crops, work is in progress only at the time when agriculturists have least to do. Services of this kind are also more easily obtained than payments in cash.

Nevertheless, even if these possibilities are taken into account, the financing of a comprehensive scheme always raises grave difficulties, particularly where the people are poorly off and are mainly small peasant farmers, as generally in the mountainous cantons, which themselves are in a precarious financial situation. In these regions, the heavy charges which a scheme generally involves may not be balanced by the advantages which accrue from it. In such a case the Confederation may increase its grants, as was done, for example, in certain regions in the Ticino, in Grisons, and in Valais.

During the last few years, attempts have been made on the occasion of comprehensive improvements to provide those farmers whose holdings are too small with the possibility of increasing them, so that they may at least attain the area necessary for the support of the family. To avoid to some extent the difficulties inherent in such a policy, the new distribution is made on the basis of the old values of estates. The increase in value resulting from the transfers is not assigned to the owners, but the corresponding area is placed at the disposal of the syndicate to use for the enlargement of small farms or for the creation of new ones.

Agricultural colonization is applied to the same end. In practice, near new villages, farms with too little land cannot be enlarged at the expense of adjoining properties; but it is sometimes possible, with the consent of the owners, to resettle the farmers together with the necessary equipment in out-of-the-way places that are farmed extensively and

are for that reason of very low value. Either the cantons or the Confederation assumes responsibility for part of the expenses of these operations, which have the advantage of lessening the pressure on lands in villages and increasing their yield.

To overcome the difficulties met with during the exchange of such special cultivation as vineyards, of wooded plots, or of building lands, separate estimates of the value of these forms of property are prepared and the losses of owners are compensated for by cash payments. In the mountains the presence of byres, barns, and other buildings also complicates the reorganization of highly fragmented holdings. Several people may share the use of a single building or, on the other hand, one farmer may have rights over several buildings. In such cases attempts are made to simplify the situation so as to facilitate the rational use of the land and buildings and at the same time to avoid excessive mortgage charges. Since compulsion is not admissible in connection with the exchange of buildings, it is necessary in such cases to rely on the understanding and good will of the owners.

Farms in mountain regions, the scattered fields of which are the result of variations in vegetation and climate, also present serious problems. Many of these farms, in fact, consist of three separate estates —in the plains, in the middle levels, and in the alpine pasture. The solution is in lightening the task and the expense of the peasants by regrouping to the greatest possible extent the lands which they possess at the various levels and by reducing to a minimum the capital invested in construction.

Economic Consequences of Systematic Consolidation

Attempts have already been made, from various angles, to obtain an exact idea of the effect of consolidation on farming conditions. The regrouping of the land and the construction of appropriate roads clearly result in an appreciable economy of work, but it is difficult to measure this precisely, since in many cases the transformation of his holding forces the agriculturist to adopt more intensive methods of production— an end otherwise highly desirable from the point of view of national economy. More precise results can be obtained by comparing the returns obtained before and after rearrangement for the same holding. Nevertheless, in view of the numerous possibilities of error inherent in this method, a satisfactory result will only be had from a great number of observations extending over several years. The Division of

Research on Agricultural Returns of the Secretariat of the Swiss Peasants Union has obtained, for the total number of farms examined, an average gross increase in returns varying from 4 to 10 percent. The reduction in total expenses is immediate only in the case of farms applied to monoculture or arable cultivation. The total gross return, on the other hand, shows a general increase of from 10 to 14 percent in all arable farms, of 28 percent in the case of grass farms, and as much as 40 percent in the few Ticinese farms examined. For the period 1933-39 the above-mentioned office has calculated the net average return per hectare of cultivated area from a large number of farm balance sheets with the results shown in Table 3.

TABLE 3.—SWITZERLAND: NET AVERAGE RETURN PER HECTARE OF CULTIVATED LAND ON TYPICAL FARMS

	Farms		Increase
	Fragmented	Consolidated	
	fr/ha.	fr/ha.	Percent
Farms on the improved 3-year rotation	108	233	116
Grass farms with some arable fields	117	261	123
Grass farms	86	261	204
Farms in the Jura without pastures	44	183	316
Mountain farms in the Ticino	23	303	1220

Needless to say, these figures have no absolute value. The last group in particular includes only a few farms, the yields of which are influenced by a large number of factors such as climate, situation, markets, lines of communication, and the skill of the farmer. The Division of Agriculture of the Federal Department of National Economy, which has recently conducted an inquiry into the profits of agriculture, remarks that after consolidation the cost of production increases slightly while the gross return improves by about 20 to 23 percent. On the whole, it may be estimated that if all the fragmented holdings in Switzerland were consolidated the cost of agricultural production would be reduced by from 15 to 20 percent.

The Task Remaining

The 123,000 hectares consolidated from 1941 to 1946, which were previously broken up into some 400,000 separate plots, now include not more than 120,000 plots. The 230,000 agricultural holdings of Switzerland still comprise a number of plots estimated at 2 million, or 8.7 plots per farm. The area remaining for consolidation (510,000 hectares) is four times more extensive than that consolidated during the period mentioned above.

The cost of consolidation still necessary in the regions where fragmentation is excessive, with the connected drainage schemes, is estimated at 975 million francs. The execution of this vast program within a reasonable time assumes increased grants from public authorities and an increased flexibility in the provisions of the law.

Experience shows that consolidation operations should apply to all the holdings which make up an economic unit. Some plots of a holding frequently fall beyond the limits of the commune and it is therefore necessary not to take up too small an area at one time and to deal with adjacent zones in successive operations.

The view is now taken that consolidation is not a mere question of geometry, aiming simply at a schematic reduction in the number of plots, but attains its full end only when it makes it possible to obtain the best possible results from the available land and also enables the exploitation of agricultural holdings, both individually and collectively, to be rationalized. In view of the significant rise in wages in the country districts, as elsewhere, it is important to eliminate as soon as possible all unproductive work caused mainly by the separation of various parts of the farm. When this important simplification is attained, the future of agriculture will be assured and the industry will be in a position to achieve the best results.

Consolidation offers a unique opportunity to resolve simultaneously a number of problems, arising from the local, regional, and national organization, which directly or indirectly affect agriculture. The range of this work can only increase as time goes on, since it envisages not only the redistribution of agricultural lands but also the removal of all conflicts of a kind to damage the conservation of the soil that feeds us. If the matter is examined from this angle, it will be seen that consolidation, which at first might seem to benefit only agriculturists, in fact also renders inestimable services to the whole community.

APPENDIX

TABLE A.—FRAGMENTATION OF HOLDINGS IN SWITZERLAND AND ITS CANTONS, 1905, 1929, AND 1939

Number of plots per holding	Switzerland			Berne		
	1905[1]	1929	1939	1905	1929	1939
1	23,435	39,328	41,608	5,833	9,727	10,190
2	19,968	27,656	29,912	4,836	6,696	6,591
3–5	50,947	53,947	55,400	12,008	11,833	11,716
6–10	52,053	47,073	44,498	10,189	8,344	7,717
11–15	29,441	25,387	23,568	4,382	3,549	3,482
16–20	19,299	14,837	13,771	2,378	1,890	1,877
21–25	12,873	8,615	8,115	1,394	1,001	1,086
26–50	25,629	14,130	12,903	2,325	1,217	1,302
51–100	7,850	4,338	3,516	397	75	65
101–150	1,310	880	718	21	4	2
Over 150	950	694	516	1	1	----------
Total Farms	243,710	236,875	234,525	43,764	44,337	44,028
Plots	3,479,207	2,508,602	2,281,272	378,086	280,601	276,692
Average number of plots per farm	14.3	10.6	9.7	8.6	6.3	6.3
Average size (in ares) of Plots	----------	45	54	----------	82	92
Farms	----------	----------	523	----------	----------	580

[1]The figures for 1905 include plots of woodland worked, together with agricultural land.

Number of plots per holding	Zurich			Lucerne			Uri		
	1905	1929	1939	1905	1929	1939	1905	1929	1939
1	733	2,148	2,411	2,300	4,514	4,030	599	551	595
2	980	1,891	2,167	1,750	1,854	2,073	483	496	530
3–5	3,816	4,509	4,692	3,027	2,248	2,449	621	454	449
6–10	4,938	4,509	4,098	1,988	1,213	1,173	105	57	45
11–15	3,106	2,680	2,214	871	322	360	7	-------	-------
16–20	2,210	1,608	1,288	382	96	75	2	-------	-------
21–25	1,707	884	665	131	20	32	1	-------	-------
26–50	3,284	779	434	115	22	16	2	-------	-------
51–100	419	11	5	7	-------	1	4	-------	-------
101–150	8	-------	-------	-------	-------	-------	-------	-------	-------
Over 150	-------	-------	-------	-------	-------	-------	-------	-------	-------
Total Farms	21,201	19,019	17,974	10,571	10,289	10,209	1,824	1,558	1,619
Plots	315,346	167,383	137,076	57,370	32,871	33,267	5,060	3,565	3,541
Average number of plots per farm	14.8	8.8	7.6	5.4	3.2	3.3	2.8	2.3	2.2
Average size (in ares) of Plots	-------	55	69	-------	237	248	-------	180	247
Farms			520			802			543

Table A.—Fragmentation of Holdings in Switzerland and its Cantons, 1905, 1929, and 1939 (Continued)

Number of plots per holding	Schwyz			Unterwald			Glaris		
	1905	1929	1939	1905	1929	1939	1905	1929	1939
1	1,100	1,342	1,230	744	917	898	159	186	262
2	928	1,157	1,147	745	697	724	188	247	227
3-5	1,465	1,146	1,307	1,036	760	807	505	528	519
6-10	583	399	392	294	192	207	484	301	295
11-15	119	88	63	46	18	27	197	114	114
16-20	38	34	24	12	3	4	94	54	52
21-25	12	16	10	6	2	-------	54	25	29
26-50	24	23	9	11	-------	2	127	74	60
51-100	-------	5	-------	2	-------	-------	42	24	14
101-150	-------	-------	-------	-------	-------	-------	6	2	-------
Over 150	-------	-------	-------	-------	-------	-------	-------	-------	-------
Total Farms	4,269	4,210	4,182	2,896	2,589	2,669	1,856	1,555	1,572
Plots	15,985	13,925	12,992	9,549	6,737	7,267	19,726	12,324	11,073
Average number of plots per farm	3.7	3.3	3.1	3.3	2.6	2.7	10.6	7.9	7.0
Average size (in ares) of Plots	-------	160	205	-------	205	197	-------	66	81
Farms			641			628			566

Number of plots per holding	Zug			Fribourg			Solothurn		
	1905	1929	1939	1905	1929	1939	1905	1929	1939
1	243	480	408	1,170	2,526	2,564	398	770	919
2	204	284	285	1,702	2,155	2,076	409	673	654
3-5	562	347	420	3,946	3,852	3,767	1,924	1,879	1,631
6-10	257	152	160	2,708	2,212	2,037	2,475	2,182	1,873
11-15	38	35	26	1,017	840	899	1,330	1,213	1,143
16-20	15	9	8	537	496	422	798	662	637
21-25	4	9	1	363	305	303	429	341	321
26-50	2	2	1	557	404	380	502	276	303
51-100	-------	-------	-------	64	23	23	28	5	10
101-150	-------	-------	-------	5	-------	-------	-------	-------	1
Over 150	-------	-------	-------	-------	-------	-------	-------	-------	-------
Total Farms	1,325	1,318	1,309	12,069	12,813	12,471	8,293	8,001	7,492
Plots	5,609	4,305	4,251	95,343	79,791	76,240	87,404	70,793	67,192
Average number of plots per farm	4.2	3.3	3.2	7.8	6.2	6.1	10.5	8.8	9.0
Average size (in ares) of Plots	-------	266	276	-------	103	116	-------	52	56
Farms			870			712			503

TABLE A.—FRAGMENTATION OF HOLDINGS IN SWITZERLAND AND ITS CANTONS, 1905, 1929, AND 1939 (Continued)

Number of plots per holding	Bâle			Schaffhausen			Appenzell		
	1905	1929	1939	1905	1929	1939	1905	1929	1939
1	258	469	521	37	186	251	2,363	3,193	2,860
2	273	423	501	58	191	263	1,318	1,036	1,216
3–5	1,381	1,438	1,198	322	672	733	1,151	509	564
6–10	1,610	1,415	1,240	776	819	738	191	65	72
11–15	770	692	624	765	662	491	20	5	6
16–20	495	347	341	687	458	379	------	4	1
21–25	319	155	152	456	295	259	1	1	------
26–50	518	211	202	850	321	319	------	------	------
51–100	110	12	15	121	16	11	------	------	------
101–150	2	------	1	7	1	1	------	------	------
Over 150	------	------	------	------	------	------	------	------	------
Total Farms	5,736	5,162	4,795	4,079	3,621	3,445	5,044	4,813	4,719
Plots	69,816	44,206	41,234	77,780	45,056	39,815	10,575	7,581	7,849
Average number of plots per farm	12.2	8.6	8.6	19.1	12.4	11.6	2.1	1.6	1.7
Average size (in ares) of Plots	------	51	55	------	31	35	------	235	262
Farms			470			407			447

Number of plots per holding	St-Gall			Grisons			Aargau		
	1905	1929	1939	1905	1929	1939	1905	1929	1939
1	3,083	4,412	4,040	708	482	780	454	1,283	1,867
2	2,305	2,769	2,849	279	477	645	763	1,433	1,667
3–5	4,667	4,638	4,958	1,219	1,715	2,037	3,702	4,500	4,408
6–10	4,200	3,305	3,253	2,288	2,460	2,585	5,449	5,615	5,082
11–15	1,628	1,292	1,150	1,877	1,687	1,751	3,575	3,235	2,789
16–20	663	379	390	1,417	1,238	1,270	2,365	1,716	1,440
21–25	259	124	105	1,076	932	919	1,552	875	701
26–50	208	64	59	2,606	2,179	2,010	2,447	746	594
51–100	13	1	2	1,021	814	724	258	24	20
101–150	------	------	------	174	165	134	3	------	------
Over 150	1	------	------	140	120	129	------	------	------
Total Farms	17,027	16,984	16,806	12,805	12,269	12,984	20,568	19,427	18,568
Plots	104,536	80,885	79,208	310,863	270,430	261,594	283,095	183,340	159,559
Average number of plots per farm	------	4.8	4.7	------	22.1	20.1	------	9.4	8.6
Average size (in ares) of Plots	------	91	104	------	20	23	------	41	47
Farms			490			476			404

Table A.—Fragmentation of Holdings in Switzerland and its Cantons, 1905, 1929, and 1939 (Concluded)

Number of plots per holding	Thurgari			Ticino			Vaud		
	1905	1929	1939	1905	1929	1939	1905	1929	1939
1	393	1,303	1,320	314	889	1,612	1,063	2,089	2,397
2	432	1,069	1,191	386	1,172	1,591	1,062	1,638	1,907
3-5	1,868	2,705	2,905	2,081	3,298	3,626	3,408	3,942	3,747
6-10	2,974	2,890	2,463	2,621	2,816	2,936	4,689	4,141	3,794
11-15	1,946	1,448	1,129	1,798	1,538	1,432	3,348	2,787	2,486
16-20	1,390	645	509	1,384	1,005	893	2,238	1,763	1,572
21-25	865	243	202	1,016	630	616	1,439	971	931
26-50	1,179	172	139	3,170	1,637	1,609	2,359	1,073	1,021
51-100	132	3	1	1,784	957	909	403	99	66
101-150	-------	-------	-------	561	367	317	34	2	-------
Over 150	-------	-------	-------	592	449	305	8	-------	-------
Total Farms	11,179	10,478	9,859	15,707	14,758	15,846	20,051	18,505	17,921
Plots	149,683	77,678	66,407	555,387	368,990	321,438	283,582	186,172	170,372
Average number of plots per farm	-------	7.4	6.7	-------	25.0	20.3	-------	10.1	9.5
Average size (in ares) of Plots	-------	71	86	-------	6	9	-------	67	77
Farms			568			184			730

Number of plots per holding	Valais			Neuchatel			Geneva		
	1905	1929	1939	1905	1929	1939	1905	1929	1939
1	507	593	823	750	973	1,081	226	295	549
2	337	568	793	338	521	621	192	208	194
3-5	965	1,774	2,295	628	718	771	645	485	401
6-10	1,832	2,966	3,401	701	600	566	701	431	371
11-15	1,857	2,652	2,908	418	299	277	326	231	197
16-20	1,756	2,119	2,287	272	183	191	166	126	111
21-25	1,554	1,650	1,621	151	83	96	84	53	66
26-50	4,992	4,717	4,236	239	136	124	112	67	83
51-100	2,990	2,251	1,631	37	11	16	18	7	3
101-150	484	339	262	3	-------	-------	2	-------	-------
Over 150	163	124	82	-------	-------	-------	-------	-------	-------
Total Farms	17,437	19,753	20,339	3,537	3,524	3,743	2,472	1,903	1,975
Plots	587,915	532,191	465,624	33,845	23,729	24,078	22,652	15,049	14,503
Average number of plots per farm	-------	26.9	23.0	-------	6.7	6.4	-------	7.9	7.3
Average size (in ares) of Plots	-------	8	11	-------	117	128	-------	93	101
Farms			253			823			730

TABLE B.—THE PROGRESS OF CONSOLIDATION OPERATIONS IN SWITZERLAND, 1885 TO 1948

Years	No. of operations	Area	Expenditure eligible for grants	Federal grants made	Consolidations completed
		(Hectares)	(........ Francs	........)	(Percent)
1885–1900	46	1,577	368,017	109,095	29.6
1901–1910	61	3,618	1,633,118	628,044	38.6
1911–1920	103	7,247	3,603,066	1,184,908	32.8
1921–1930	264	31,508	29,581,894	9,678,699	32.7
1931–1940	193	36,929	27,658,503	9,145,967	33.1
1941–1948	181	39,929	36,664,828	16,394,289	44.6
1885–1948 schemes completed	848	120,808	99,509,426	37,141,002	37.3
1948 being executed	250	106,376	152,451,600	74,375,740	48.8

Years	Average area covered by a scheme	Average subsidized expenditure	
		Per scheme	Per hectare
	(Hectares)	(.............. Francs	..............)
1885–1900	34.3	8,000	233.35
1901–1910	59.3	26,770	451.40
1911–1920	70.3	34,980	497.20
1921–1930	119.3	112,052	938.90
1931–1940	191.3	143,308	748.95
1941–1948	220.6	202,567	918.25
Schemes being executed, 1948	425.5	609,806	1,433.15

(continued from inside front cover)

Weed Control by Growth-Regulating Substances, 1951. 36 pp. 5 illustrations, 2 tables. Price $0.50 2s.6d.
A convenient guide on the use of hormone weed killers, intended primarily for technicians.

Improving the World's Grasslands, 1951, 147 pp., 107 illustrations, 12 tables. Price 10s.6d.
An international study bringing together on a world-wide scale the latest information on grassland improvement. Available from the publisher, Leonard Hill, Ltd., 9 Eden Street, London N.W. 1. (English edition only. French and Spanish editions in preparation.)

Communal Land Tenure, 1953, vi + 58 pp. Price $0.50 2s.6d.
Sir Gerald Clauson, K.C.M.G., the author of this paper, was until recently a high official in the British Colonial Office in London. The paper is one of a group of connected studies on land tenure and related subjects to be pubblished as part of the FAO program of agrariam reform.

Cadastral Surveys and Records in Rights in Land, vi + 68 pp. Price $0.50 2s.6d.
Sir Bernard Binns, K.B.E., author of this paper, was for five years head of the Department of Settlements and Land Records in Burma, and was also for two years, as Financial Commissioner, responsible for the whole land records administration of which the Land Records Department was an integral part.

Zebu Cattle of India and Pakistan, 1953, viii + 256 pp. Price $3.00 15s.
Information has been assembled on each breed which is considered of sufficient importance to be of interest to breeders in countries other than India and Pakistan where Zebu cattle might be used in improvement programs.

Soil Surveys for Land Development, 1953, xii + 110 pp. Price $ 1.00 5s.
Sufficient of the techniques of soil classification and mapping are outlined so that the mode of operation, the type of equipment involved and the cost of the work can be accurately assed. Maps in color. Good bibliography.

Legumes in Agriculture, 1953, xvi + 366 pp. Price $3.00 15s.
More than the other successful FAO symposia (*Soil Conservation, The Efficient Use of Fertilizers* and *Improving the World's Grasslands*) this monograph brings together material nowhere else available in one place.

Agricultural Development and Rural Reform in Denmark, 1953, viii + 320 pp. Price $3.00 15s.
FAO is now giving considerable attention to land tenure problems. This monograph covers not only the subject of land tenure, but also several aspects of agricultural development in Denmark closely associated with this subject, so that it can be considered as a significant contribution to the work of FAO in this field.

Milk Pasteurization: Planning, Plant, Operation and Control, 1953, 203 pp. Price $2.50 12s.6d.
"Although this book is intended for countries where pasteurization is in its initial stages, we find that it contains information useful to many who are working in this field in our country." (Conserva, The Hague.)

Joint WHO/FAO Expert Committee on Brucellosis, Second report, 1953, 34 pp. Price $0.25 1s.3d.

Advances in the Control of Zoonoses, 1953, 75 pp. Price $3.00 15s.
Bovine Tuberculosis, Brucellosis - Leptospirosis, Q. Fever, Rabies, are the diseases of animals transmissible to man dealt with in this FAO/WHO monograph.

Inter-Relationship between Agrarian Reform and Agricultural Development, 1953, 65 pp. Price $0,75 3s.9d.

SALES AGENTS FOR FAO PUBLICATIONS

ARGENTINA: Editorial Sudamericana, S. A., Alsina 500, Buenos Aires.
AUSTRALIA: H. A. Goddard Pty., 255a George Street, Sydney.
AUSTRIA: Wilhelm Frick Verlag, Graben 27, Vienna 1.
BELGIUM: Agence et Messageries de la Presse, 14/22 rue du Persil, Brussels.
BRAZIL: Livraria Agir, rua Mexico 98-B, Rio de Janeiro.
BURMA: (*Wholesale*) Orient Longmans Ltd. 17 Chittaranjan Avenue, Calcutta 13, India.
CANADA: The Ryerson Press, 299 Queen Street West, Toronto 2, Ontario; Periodica, 5112 Ave. Papineau, Montreal - 34.
CEYLON: (*Wholesale*) Orient Longmans Ltd, 17 Chittaranjan Avenue, Calcutta 13, India.
CHILE: Sala y Vila, Ltda, Bandera 140F, Santiago.
COLOMBIA: "Agricultura Tropical", Carrera 13 No. 13-17, Bogota.
COSTA RICA: Trejos Hermanos, Apartado 1313, San José.
CUBA: René de Smedt, La Casa Belga, O'Reilly 455, Havana.
CYPRUS: Marcos E. Constantinides, P. O. Box 473, Nicosia.
DENMARK: Ejnar Munksgaard, Norregade 6, Copenhagen K.
ECUADOR: "La Hacienda", Malecon 710-711 y Roca, Guayaquil.
EGYPT: Librairie de la Renaissance d'Egypte, 9 sh. Adly Pasha, Cairo.
EL SALVADOR: Manuel Navas y Cia., 1a Avenida Sur 35, San Salvador.
FINLAND: Akateeminen Kirjakauppa, 2 Keskuskatu, Helsinki.
FRANCE: Les Editions A. Pedone, 13 rue Soufflot, Paris 5e.
GERMANY: Paul Parey, Lindenstr. 44-47, Berlin SW 68.
GREECE: "Eleftheroudakis", Place de la Constitution, Athens.
GUATEMALA: Goubaud y Cia., Ltda., 5a Avenida Sur No. 28, Guatemala.
HAITI: Max Bouchereau, Librairie "A la Caravelle", B.P. 111B, Port-au-Prince.
ICELAND: Halldor Jonsson, Mjostroeti 2, Reykjavik - Jonsson & Juliusson, Garöastraeti 2, Reykjavik.
INDIA: Orient Longmans Ltd., 17 Chittaranjan Avenue, Calcutta 13; Nicol Road, Ballard Estate, Bombay 1; 36-A Mount Road, Madras 2; 17-60 Sanyasiraju Street, Gandhinagar, Vijayawada 2; Kanson House, Delhi-Ajmeri Gate Scheme, New Delhi. *Retail agent:* The Oxford Book and Stationery Co., Scindia House, New Delhi; 17 Park Street, Calcutta.
IRELAND: The Controller, Stationery Office, Dublin.
ISRAEL: Blumstein's Bookstore Ltd., P. O. Box 4154, Tel Aviv.
ITALY: Libreria Internazionale Ulrico Hoepli, Galleria Piazza Colonna, Rome; Libreria Internazionale Dr. Romano Romani, Via Meravigli 16, Milan.
JAPAN: Maruzen Company Ltd., Tori-Nichome 6, Nihonbashi, Tokyo.
LEBANON: Librairie Universelle, Avenue des Français, Beirut.
MEXICO: Manuel Gómez Pezuela e Hijo, Donceles 12, Mexico, D. F.
NETHERLANDS: N. V. Martinus Nijhoff, Lange Voorhout 9, The Hague.
NEW ZEALAND: Whitcombe & Tombs Ltd., Auckland, Wellington, Hamilton, Christchurch, Dunedin, Invercargill, Timaru.
NORWAY: Johan Grundt Tanum Forlag, Kr. Augustsgt. 7a, Oslo.
PAKISTAN: East: Farcos' Publications, 2 Inglis Road, P.O. Box 13, Ramna, Dacca; West: Ferozsons, 60 The Mall, Lahore.
PERU: Libreria Internacional del Perù, S. A., Casilla 1417, Lima.
PHILIPPINES: D. P. Pérez Company, 169 Riverside, San Juan, Rizal.
PORTUGAL: Livraria Bertrand, S.A.R.L., 73-75 Rua Garrett, Lisbon.
SPAIN: Aguilar, S.A. Ediciones, Juan Bravo 38, Madrid;
José Bosch Librero, Ronda Universitad 11, Barcelona.
SWEDEN: C. E. Fritze, Fredsgatan 2, Stockholm 16; Henrik Lindstahls Bokhandel, Odengatan 22, Stockholm. Gumperts AB. Göteborg.
SWITZERLAND: Librairie Payot, S. A., Lausanne and Geneva; Hans Raunhardt, Kirchgasse 17, Zurich 1.
SWITZERLAND: Librairie Payot, S. A., Lausanne and Geneva.
Hans Raunhardt, Kirchgasse 17, Zurich 1.
SYRIA: Librairie Universelle, Avenue Fouad 1er, B.P. 336, Damascus.
TAIWAN: The World Book Company Ltd., 99 Chungking South Road, Section 1, Taipei.
THAILAND: Requests for FAO publications should be addressed to: FAO Regional Office for Asia and the Far East, Maliwan Mansion, Bangkok.
TURKEY: Librairie Hachette, 469 Istiklal Caddesi, Beyoglu, Istanbul.
UNION OF SOUTH AFRICA: Van Schaik's Book Store Pty. Ltd., P. O. Box 724, Pretoria.
UNITED KINGOM: H. M. Stationery Office, P. O. Box 569, London S.E.1.
UNITED STATES OF AMERICA: Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.
URUGUAY: Héctor d'Elia, Oficina de Representación de Editoriales, 18 de Julio 1333, Montevideo.
VENEZUELA: Suma, S. A., Sabana Grande 102, "El Recreo", Caracas.
YOGOSLAVIA: Drzavno Preduzece, Jugoslovenska Knjiga, Belgrade.

Requests from countries where sales agents have not yet been appointed may be sent to: FAO Documents Sales Service, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

FAO publications are priced in U. S. dollars and pounds sterling. Payment to FAO sales agents may be made in local currencies.

Price: $ 1.00 or 5 s.